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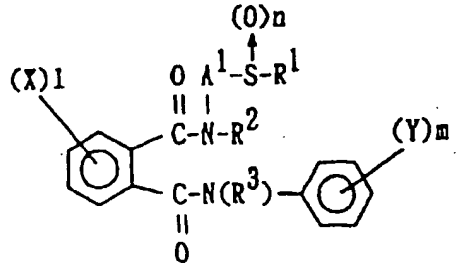
(54) Phthalamide derivatives, or salt thereof agrohorticultural insecticide, and method for using the same

(57) The present invention provides a phthalamide derivative of the formula (I):



(I)

[wherein A^1 is (substituted) C_1-C_8 alkylene, (substituted) C_3-C_8 alkenylene, (substituted) C_3-C_8 alkynylene, etc., R^1 is H, (halo) C_3-C_6 cycloalkyl, (substituted) phenyl, (substituted) heterocycle, $-A^2-R^4$, etc., R^2 and R^3 are H, C_3-C_6 cycloalkyl, $-A^2-R^4$, etc., A^2 is -C(=O)-, -C(=S)- or -C(=NR^5)-, R^4 is H, alkyl, (substituted) phenyl, (substituted) heterocycle, etc., X and Y are halogen, cyano, nitro, (halo) C_1-C_6 alkyl, (halo) C_1-C_6 alkoxy, etc., 1 is 0-4, m is 0-5, n is 0-2]; and an agrohorticultural insecticide containing said compound as active ingredient and exhibiting an excellent insecticidal effect.

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention relates to a phthalamide derivative or salt thereof, an agrohorticultural insecticide containing said compound as an active ingredient thereof, and a method for using the agrohorticultural agent.

RELATED ART

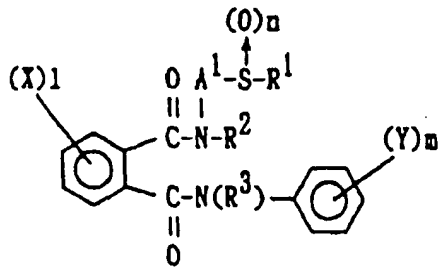
[0002] JP-A-61-180753 discloses some of the phthalamide derivatives of the present invention. However, in that patent application specification, there is neither disclosed nor suggested about usefulness of said derivatives as an agrohorticultural insecticide. Further, although similar compounds are disclosed in JP-A-59-163353 and J. C. S. Perkin I, 1338-1350 (1978), etc., there is made no mention nor suggestion in these publications about usefulness of those compounds as an agrohorticultural insecticide.

SUMMARY OF THE INVENTION

[0003] The present inventors have conducted extensive studies with the aim of developing a novel agrohorticultural agent. As a result, it has been found that the phthalamide derivatives of the present invention represented by general formula (I), which are novel compounds not found in literature, can be put to a novel use as an agrohorticultural insecticide comprising not only these novel compounds but also some known compounds disclosed in prior art. Based on this finding, the present invention has been accomplished.

DETAILED DESCRIPTION OF THE INVENTION

[0004] The present invention relates to phthalamide derivatives represented by the following general formula (I) or salt thereof, an agrohorticultural insecticide containing, as active ingredients thereof, the phthalamide derivative represented by the general formula (I) or salt thereof and some known compounds, and a method for using the same:



(I)

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, hydroxy C_1-C_6 alkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen

atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkynylene group, or substituted C_3-C_8 alkynylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group,

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group, C_3-C_8 alkynylene group and substituted C_3-C_8 alkynylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group and substituted C_3-C_8 alkenylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring or C_3-C_6 cycloalkene ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^2-R^4$ [wherein A^2 represents -C(=O)-, -C(=S)-, -C(=NR^5)- (in which R^5 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkoxy group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, phenyl group or substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group),

C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents -C(=O)-, -C(=S)-or -C(=NR^5)- wherein R^5 is as defined above, R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6

alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -Z^1-R^6 wherein Z^1 represents -O-, -S- or -N(R^7)- (wherein R^7 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group or C_1-C_6 alkoxycarbonyl group), and R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(2) in cases where A^2 represents C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^4 represents hydrogen atom, halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -Z^2-R^8 wherein Z^2 represents -O-, -S-, -SO-, -SO_2-, -N(R^9)- (wherein R^9 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), -C(=O)- or -C(=NOR^{10})- (wherein R^{10} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group) and R^8 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6

alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group], or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;
R^2 and R^3 which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group or $-A^2-R^4$ wherein A^2 and R^4 are as defined above; or
alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;
X which may be same or different, represents halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^3-R^{11}$ [wherein A^3 represents -O-, -S-, -SO-, $-SO_2-$, -C(=O)-, $-C(=NOR^{12})-$ (in which R^{12} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^3 represents -O-, -S-, -SO- or $-SO_2-$, R^{11} represents halo C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^4-R^{13}$ (wherein A^4 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{13} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen

atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^5-R^{14} (wherein A^5 represents -O-, -S-, -SO-, -SO_2- or -C(=O)-, and R^{14} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group)), and

(2) in cases where A^3 represents -C(=O)- or -C(=NOR^{12})- wherein R^{12} is as defined above, R^{11} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylamino group, substituted phenylamino group having on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(3) in cases where A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^{11} represents hydrogen atom, hydroxy group, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^6-R^{15} (wherein A^6 represents -O-, -S-, -SO- or -SO_2-, and R^{15} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di

C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^7-R^{16} (wherein A^7 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{16} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group))]; and l represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

Y may be same or different and represents halogen atom, cyano group, nitro group, halo C_3-C_6 cycloalkyl group, tri C_1-C_6 alkylsilyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^3-R^{11} wherein A^3 and R^{11} are as defined above; and m represents an integer of 0 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents

selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, and substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

n represents an integer of 0 to 2;

provided that when X, R^2 and R^3 simultaneously represent hydrogen atom, m represents an integer of 2, Y of the 2-position represents fluorine atom and Y of the 3-position represents chlorine atom, then A^1 is not propylene group, R^1 is not methyl group and n is not an integer of 0.

[0005] In the definition of the general formula (I) representing the phthalamide derivative of the present invention, the term "halogen atom" means chlorine atom, bromine atom, iodine atom or fluorine atom; the term "C_1-C_6 alkyl" means a straight or branched chain alkyl group having 1 to 6 carbon atoms such as methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, s-butyl, t-butyl, n-pentyl, n-hexyl and the like; the term "halo C_1-C_6 alkyl" means a straight or branched chain alkyl group having 1 to 6 carbon atoms which may be substituted with at least one, same or different halogen atoms; the term "C_1-C_8 alkylene" means a straight or branched chain alkylene group having 1 to 8 carbon atoms such as methylene, ethylene, propylene, trimethylene, dimethylmethylene, tetramethylene, isobutylene, dimethylethylene, octamethylene and the like; the term "a 5- to 8- or 5- to 7-membered ring which may be intercepted by 1 to 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms formed by R^1 with A^1, or R^2 with A^1 or R^1" means, for example, perhydrothiazine ring, thiazolidine ring, thiazetidine ring, dihydrothiazine ring, thiazoline ring, perhydroxathiazine ring, dihydroxathiazine ring, dithiazine ring, perhydrodithiazine ring, and the like.

[0006] The term "heterocyclic group" means 5- to 6-membered heterocyclic group having one or more same or different hetero atoms selected from oxygen atoms, sulfur atoms or nitrogen atoms such as pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyranyl group, tetrahydrothiopyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, trithiazolyl group, pyrazolyl group, and the like. As the "fused ring", there can be exemplified naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, indole, indoline, coumarone, isocoumarone, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole, indazole, and the like.

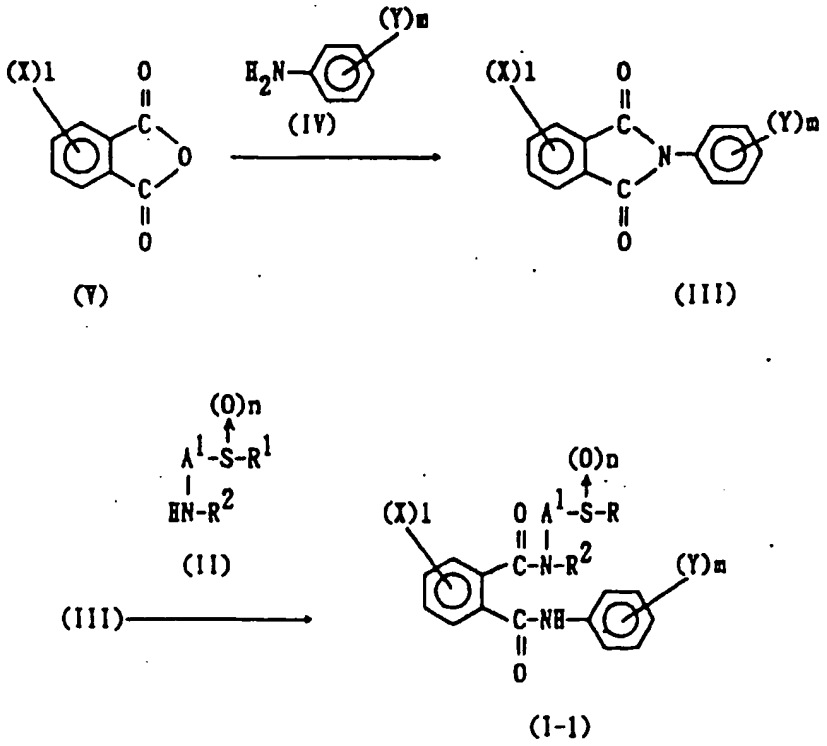
[0007] As a salt of a phthalamide derivative represented by the general formula (I) of the present invention, there can be exemplified inorganic acid salt such as hydrochlorate, sulfate, nitrate, phosphate and the like; organic acid salt such as acetate, fumarate, maleate, oxalate, methanesulfonate, benzenesulfonate, p-toluenesulfonate and the like; and salt of metallic ion such as sodium ion, potassium ion, calcium ion and the like.

[0008] Some of the phthalamide derivatives represented by the general formula (I) of the present invention contain an asymmetric carbon atom or an asymmetric center in the structural formula thereof, and in some cases there can exist two optical isomers. The present invention includes all these optical isomers and all the mixtures consisting of arbitrary proportions of these optical isomers.

[0009] Preferable examples of each substituent of the phthalamide derivative of general formula (I) or salt thereof of the present invention are A^1 is a straight or branched C_1-C_8 alkylene group; R^1 is C_1-C_6 alkyl group or halo C_1-C_6 alkyl group; each of R^2 and R^3 is hydrogen atom or C_1-C_6 alkyl group; X is halogen atom, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group or halo C_1-C_6 alkoxy group; and Y is halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group or halo C_1-C_6 alkoxy group.

[0010] The phthalamide derivatives of the present invention represented by the general formula (I) can be produced, for example, by the production processes mentioned below.

Production process 1



wherein R^1, R^2, A^1, X, Y, l, m and n are as defined above.

[0011] A phthalic anhydride derivative of the general formula (V) is reacted with an aniline of the general formula (IV) in the presence of an inert solvent to obtain a phthalimide derivative of the general formula (III). The phthalimide derivative (III) is reacted with an amine of the general formula (II) after or without being isolated, whereby a phthalamide derivative of the general formula (I-1) can be produced.

(1) General formula (V) → general formula (III)

[0012] As the inert solvent used in this reaction, any solvent may be used so long as it does not markedly inhibit the progress of the reaction. There can be exemplified aromatic hydrocarbons such as benzene, toluene, xylene, etc.; halogenated hydrocarbons such as dichloromethane, chloroform, carbon tetrachloride, etc., chlorinated aromatic hydrocarbons such as chlorobenzene, dichlorobenzene, etc.; acyclic or cyclic ethers such as diethyl ether, dioxane, tetrahydrofuran, etc., esters such as ethyl acetate, etc.; amides such as dimethylformamide, dimethylacetamide, etc.; acids such as acetic acid, etc.; dimethyl sulfoxide; and 1,3-dimethyl-2-imidazolidinone. These inert solvents may be used alone or as a mixture thereof.

[0013] Since the reaction is an equimolar reaction, it is sufficient that the reactants are used in equimolar amounts, though either of them may be used in excess. If necessary, the reaction may be carried out under dehydrating conditions.

[0014] As to the reaction temperature, the reaction can be carried out in a temperature range of room temperature to the reflux temperature of the inert solvent used. Although the reaction time is varied depending on the scale of reaction, the reaction temperature, etc., it may be properly chosen in a range of several minutes to 48 hours.

[0015] After completion of the reaction, the desired compound is isolated from the reaction solution containing the desired compound by a conventional method, and if necessary, purified by recrystallization, column chromatography, etc., whereby the desired compound can be produced. The desired compound can be subjected to the subsequent reaction without isolation from the reaction solution.

[0016] The phthalic anhydride derivative of the general formula (V) can be produced by the process described in J.

Org. Chem., 52, 129 (1987), J. Am. Chem. Soc., 51, 1865 (1929), J. Am. Chem. Soc., 63, 1542 (1941), etc. The aniline of the general formula (IV) can be produced by the process described in J. Org. Chem., 29, 1 (1964), Angew. Chem. Int. Ed. Engl., 24, 871 (1985), Synthesis, 1984, 667, Bulletin of the Chemical Society of Japan, 1973, 2351, DE-2606982, JP-A-1-90163, etc.

(2) General formula (III) → general formula (I-1)

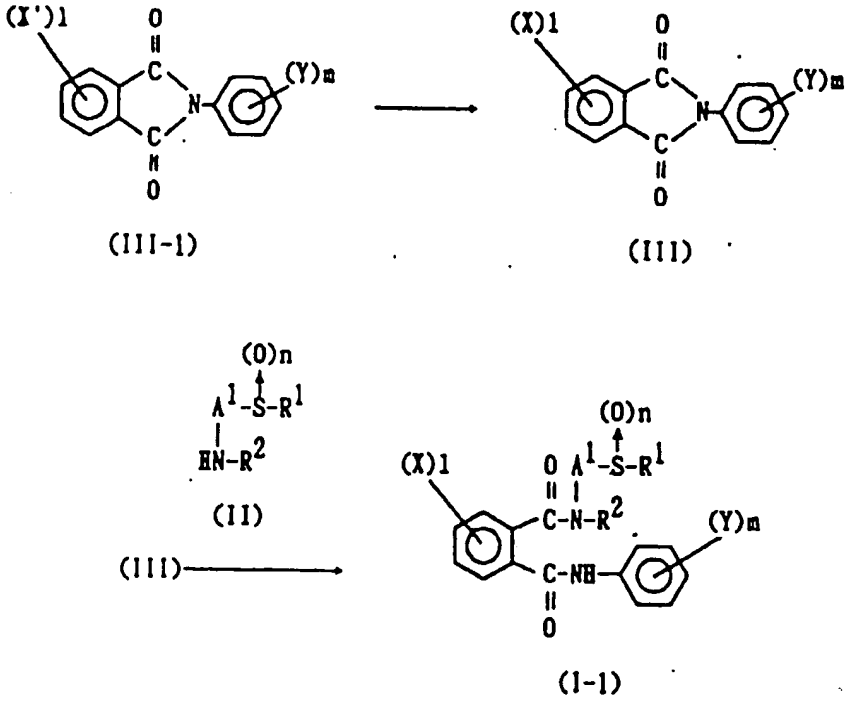
[0017] In this reaction, there can be used the inert solvents exemplified above as the inert solvent used in the reaction (1).

[0018] Since the reaction is an equimolar reaction, it is sufficient that the reactants are used in equimolar amounts, though the amine of the general formula (II) may be used in excess.

[0019] As to the reaction temperature, the reaction can be carried out in a temperature range of room temperature to the reflux temperature of the inert solvent used. Although the reaction time is varied depending on the scale of reaction, the reaction temperature, etc., it may be properly chosen in a range of several minutes to 48 hours.

[0020] After completion of the reaction, the desired compound is isolated from the reaction solution containing the desired compound by a conventional method, and if necessary, purified by recrystallization, column chromatography, etc., whereby the desired compound can be produced.

Production process 2



wherein R^1, R^2, A^1, X, Y, l, m and n are as defined above, X' is a halogen atom or a nitro group, provided that X is other than a hydrogen atom or a nitro group.

[0021] A phthalimide derivative of the general formula (III-1) is reacted with a reactant corresponding to X in the presence of an inert solvent to obtain a phthalimide derivative of the general formula (III). The phthalimide derivative (III) is reacted with an amine of the general formula (II) after or without being isolated, whereby a phthalamide derivative of the general formula (I-1) can be produced.

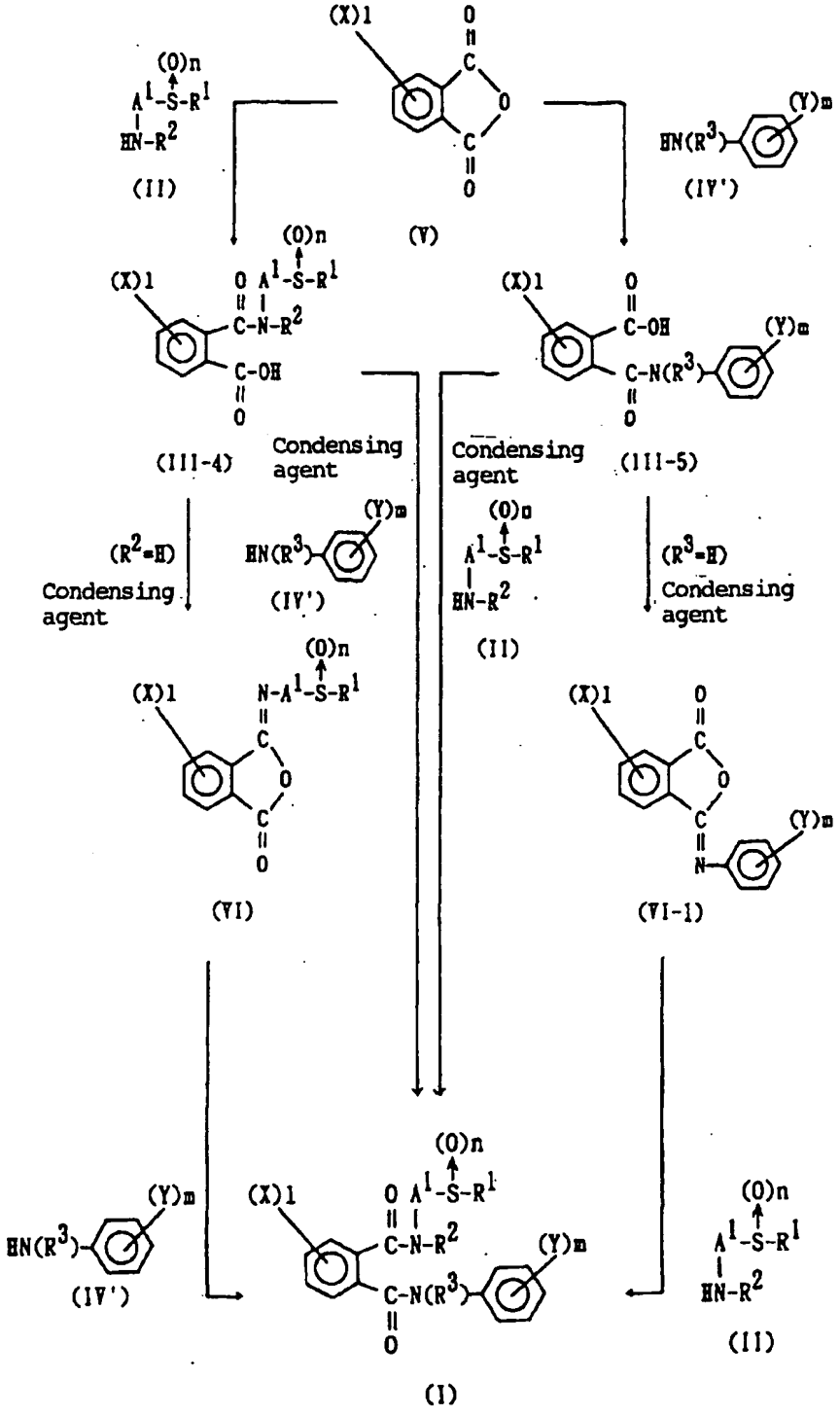
(1) General formula (III-1) → general formula (III)

[0022] This reaction can be carried out according to the methods described in J. Org. Chem., 42, 3415 (1977), Tetrahedron, 25, 5921 (1969), Synthesis, 1984, 667, Chem. Lett., 1973, 471, J. Org. Chem., 39, 3318 (1974), J. Org. Chem., 39, 3327 (1974), etc.

(2) General formula (III) → general formula (I-1)

[0023] This reaction can be carried out according to production process 1-(2).

Production process 3



wherein R^1, R^2, R^3, A^1, X, Y, l, m and n are as defined above.

[0024] A phthalic anhydride derivative of the general formula (V) is reacted with an amine of the general formula (II) in the presence of an inert solvent to obtain a phthalamic acid of the general formula (III-4). The phthalamic acid (III-4)

is treated as follows after or without isolation. When R^2 of the phthalamic acid (III-4) is a hydrogen atom, the phthalamic acid (III-4) is condensed into a compound of the general formula (VI) in the presence of a condensing agent, and the compound (VI) is reacted with an aniline of the general formula (IV') in the presence of an inert solvent after or without being isolated. When R^2 of the phthalamic acid (III-4) is other than a hydrogen atom, the phthalamic acid (III-4) is condensed with an aniline of the general formula (IV) in the presence of a condensing agent. Thus, a phthalamide derivative of the general formula (I) can be produced.

[0025] Alternatively, a phthalic anhydride derivative of the general formula (V) is reacted with an aniline of the general formula (IV') in the presence of an inert solvent to obtain a phthalamic acid of the general formula (III-5). The phthalamic acid (III-5) is treated as follows after or without isolation. When R^3 of the phthalamic acid (III-5) is a hydrogen atom, the phthalamic acid (III-5) is condensed into a compound of the general formula (VI-1) in the presence of a condensing agent, and the compound (VI-1) is reacted with an amine of the general formula (II) in the presence of an inert solvent after or without being isolated. When R^3 of the phthalamic acid (III-5) is other than a hydrogen atom, the phthalamic acid (III-5) is condensed with an amine of the general formula (II) in the presence of a condensing agent. Thus, a phthalamide derivative of the general formula (I) can be produced.

(1) General formula (V) or general formula (VI-1) → general formula (III-4) or general formula (I), respectively

[0026] The desired compound can be produced by this reaction in the same manner as in production process 1-(2).

(2) General formula (III-4) or general formula (III-5) → general formula (VI) or general formula (VI-1), respectively

[0027] The desired compound can be produced by this reaction according to the method described in J. Med. Chem., 10, 982 (1967).

(3) General formula (VI) or general formula (V) → general formula (I) or general formula (III-5), respectively

[0028] The desired compound can be produced by this reaction in the same manner as in production process 1-(2).

(4) General formula (III-4) or general formula (III-5) → general formula (I)

[0029] The desired compound can be produced by reacting the phthalamic acid derivative of the general formula (III-4) or the general formula (III-5) with the aniline of the general formula (IV') or the amine of the general formula (II), respectively, in the presence of a condensing agent and an inert solvent. If necessary, the reaction can be carried out in the presence of a base.

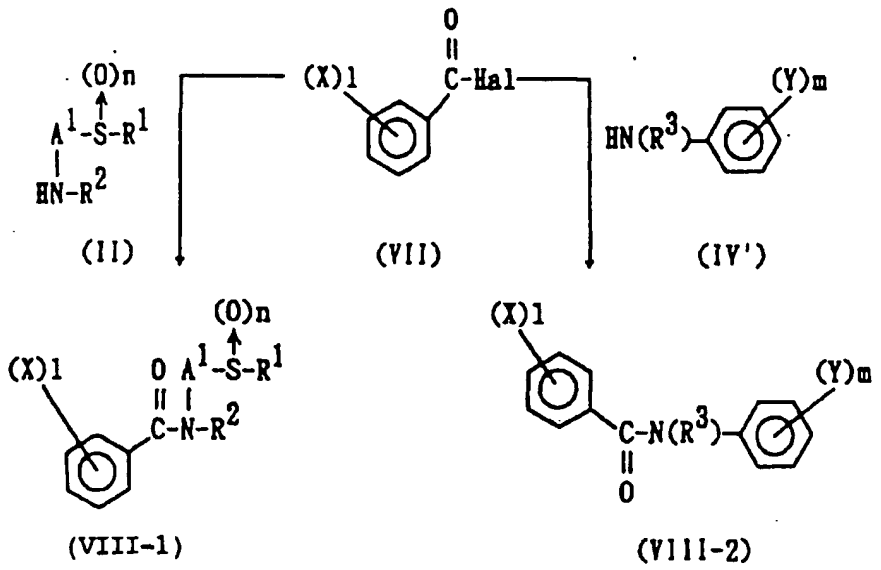
[0030] The inert solvent used in the reaction includes, for example, tetrahydrofuran, diethyl ether, dioxane, chloroform and dichloromethane. As the condensing agent used in the reaction, any condensing agent may be used so long as it is used in usual amide synthesis. The condensing agent includes, for example, Mukaiyama reagent (e.g. 2-chloro-N-methylpyridinium iodide), 1,3-dicyclohexylcarbodiimide (DCC), carbonyldiimidazole (CDI) and diethyl phosphorocyanidate (DEPC). The amount of the condensing agent used may be properly chosen in a range of 1 mole to excess moles per mole of the phthalamic acid derivative of the general formula (III-4) or the general formula (III-5).

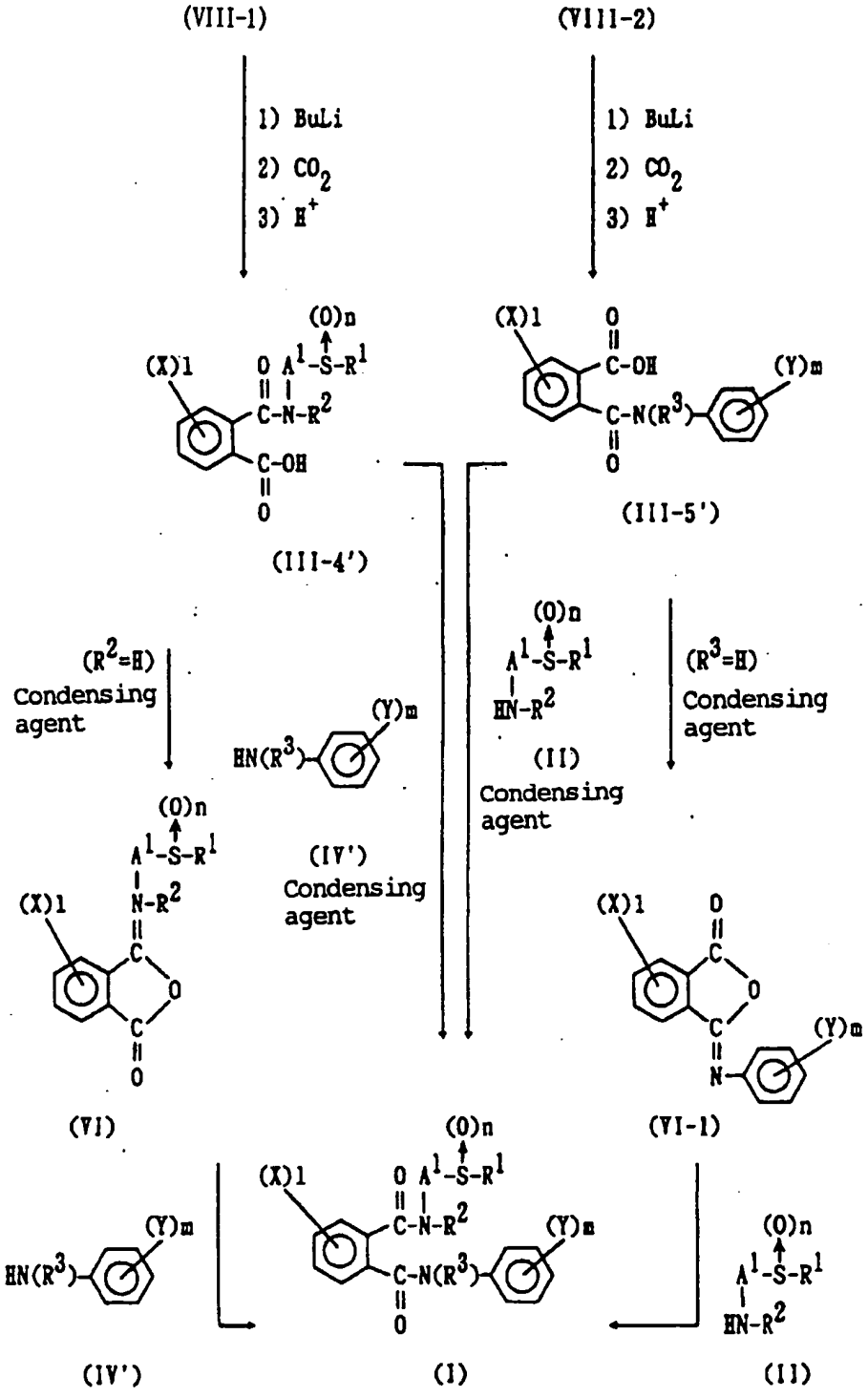
[0031] As the base usable in the reaction, there can be exemplified organic bases such as triethylamine, pyridine, etc. and inorganic bases such as potassium carbonate, etc. The amount of the base used may be properly chosen in a range of 1 mole to excess moles per mole of the phthalamic acid derivative of the general formula (III-4) or the general formula (III-5).

[0032] As to the reaction temperature, the reaction can be carried out in a temperature range of 0°C to the boiling point of the inert solvent used. Although the reaction time is varied depending on the scale of reaction, the reaction temperature, etc., it ranges from several minutes to 48 hours.

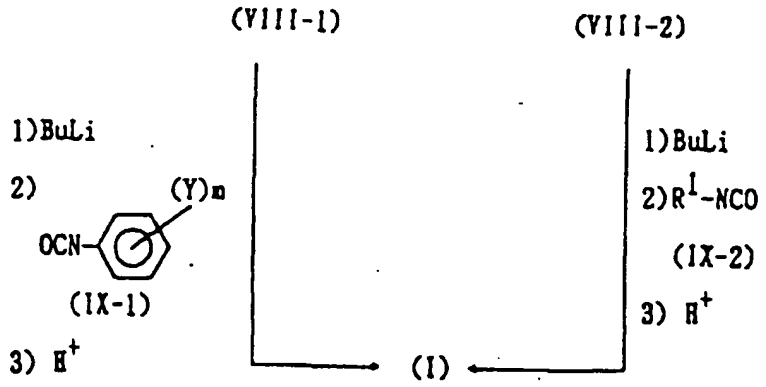
[0033] After completion of the reaction, the desired compound is isolated from the reaction solution containing the desired compound by a conventional method, and if necessary, purified by recrystallization, column chromatography, etc., whereby the desired compound can be produced.

Production Process 4





wherein R^1, R^2, A^1, X, Y, l, m and n are as defined above, and Hal is halogen atom.



wherein R^1, Y and m are as defined above.

[0034] A benzoyl halide of the general formula (VII) is reacted with an amine derivative of the general formula (II) or (IV') in the presence of an inert solvent to obtain a benzamide of the general formula (VIII-1) or (VIII-2). The benzamide (VIII-1) or (VIII-2) is ortho-metallized with a metallic reagent such as butyllithium or the like and then directly reacted with an isocyanate of the general formula (IX-1) or (IX-2). Alternatively, the benzamide (VIII-1) or (VIII-2) is reacted with carbon dioxide to obtain a phthalamic acid of the general formula (III-4') or (III-5') and then treated in the same manner as in Production process 3-(1) to (4). Thus, a phthalamide derivative of the general formula (I) can be produced.

(1) General formula (VII) → general formula (VIII-1) or general formula (VIII-2)

[0035] The desired compound can be produced according to the description of J. Org. Chem. 32, 3069 (1967), etc.

(2) General formula (VIII-1) or general formula (VIII-2) → general formula (I)

[0036] The desired compound can be produced by converting a benzamide of the general formula (VIII-1) or (VIII-2) into an ortho-lithio compound according to the description of J. Org. Chem. 29, 853 (1964) and then reacted with an isocyanate of the general formula (IX-1) or (IX-2) at a temperature of -80°C to room temperature, whereby the desired compound can be produced.

(3) General formula (VIII-1) or general formula (VIII-2) → general formula (III-4') or general formula (III-5'), respectively

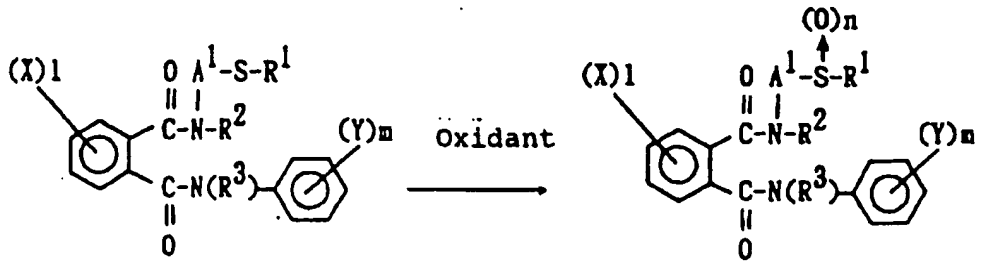
[0037] The desired compound can be produced by the same conversion into an ortho-lithio compound as in (2), followed by introduction of carbon dioxide at a temperature of -80°C to room temperature.

[0038] After completion of the reaction, the desired compound is isolated from the reaction solution by the conventional method and, if necessary, purified by recrystallization, column chromatography, etc., whereby the desired compound can be produced.

(4) General formula (III-4') or general formula (III-5') → general formula (I)

[0039] The desired compound can be produced by the same procedure as in production process 3-(1) to (4).

Production process 5



wherein R^1, R^2, R^3, A^1, X, Y, l, m and n are as defined above, provided that n cannot be an integer of 0.

[0040] A phthalamide derivative of the general formula (I-2) is reacted with an oxidant in the presence of an inert solvent, whereby a phthalamide derivative of the general formula (I-3) can be produced.

[0041] As the inert solvent used in this reaction, there can be exemplified halogenated hydrocarbons such as dichloromethane, chloroform, etc., aromatic hydrocarbon such as toluene, xylene, etc., acids such as acetic acid, etc., and alcohols such as methanol, ethanol, propanol, etc.

[0042] As the oxidant, there can be exemplified m-chloroperbenzoic acid, peracetic acid, potassium metaperiodate, potassium hydrogen persulfate (Oxon), hydrogen peroxide, etc. The amount of the oxidant may be properly selected in the range of 0.5 to 3 equivalents per equivalent of the phthalic acid diamide derivative of the general formula (I-2).

[0043] As to the reaction temperature, the reaction can be carried out in a temperature range of -50°C to the boiling temperature zone of the inert solvent used. Though the reaction time is varied depending on the reaction temperature and scale of the reaction, it is in the range of several minutes to 24 hours.

[0044] After completion of the reaction, the desired compound is isolated from the reaction solution containing the desired compound by a conventional method and, if necessary, purified by recrystallization, column chromatography, etc., whereby the desired compound can be produced.

[0045] Next, typical phthalamide derivatives of the general formula (I) are exemplified in Tables 1, 2 and 3. The present invention is by no means limited by these examples.

General formula (I)

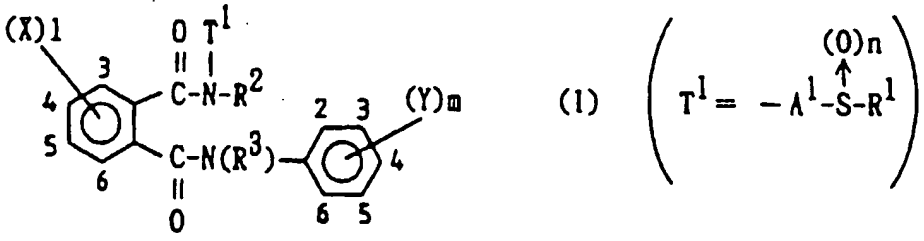


Table 1 (R^2=R^3=H)

No	T'	(X)l	(Y)m	Property mp (°C)
1	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-C_2F_5	179-180
2	$CH(CH_3)CH_2S$-i-C_3H_7	3-I	2-CH_3-4-C_2F_5	Paste
3	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-OCF_3	147
4	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-$OCHF_2$	107
5	$CH(CH_3)CH_2S$-i-C_3H_7	3-I	2-CH_3-4-OCF_3	126
6	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	197-199
7	$CH(CH_3)CH_2SCH_3$	3-I	2-Cl-4-C_2F_5	143
8	$CH(CH_3)CH_2SCH_3$	3-I	4-OCF_3	171-178
9	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-Cl	179
10	$CH(CH_3)CH_2SCH_3$	3-F	2-CH_3-4-i-C_3F_7	146-154
11	$CH(CH_3)CH_2SCH_3$	3-F	2-CH_3-4-C_2F_5	140
12	$CH(CH_3)CH_2SCH_3$	3-F	2-CH_3-4-OCF_3	122-130
13	$CH(CH_3)CH_2SCH_3$	3-F	2-CH_3-4-$OCHF_2$	149-154
14	$CH(CH_3)CH_2SCH_3$	H	2-CH_3-4-C_2F_5	139-146
15	$CH(CH_3)CH_2SCH_3$	H	2-CH_3-4-OCF_3	140-144
16	$CH(CH_3)CH_2SCH_3$	H	2-CH_3-4-i-C_3F_7	139-145
17	$CH(CH_3)CH_2SPh$	3-I	2-CH_3-4-C_2F_5	Paste
18	$CH(CH_3)CH_2SPh$	3-I	2-CH_3-4-OCF_3	Paste
19	$CH(CH_3)CH_2SPh$	3-I	2-CH_3-4-i-C_3F_7	Paste
20	$CH(CH_3)CH_2SPh$	3-I	2-C_2H_5-4-C_2F_5	Paste
21	$CH(CH_3)CH_2SC_2H_5$	3-I	2-CH_3-4-C_2F_5	Paste
22	$CH(CH_3)CH_2SC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	107

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
23	$CH(CH_3)CH_2SC_2H_5$	3-I	$2-CH_3-4-OCF_3$	143
24	$CH(CH_3)CH_2SC_2H_5$	3-I	$2-CH_3-4-Cl$	161-166
25	$CH(CH_3)CH_2SC_2H_5$	3-F	$2-CH_3-4-i-C_3F_7$	142
26	$CH(CH_3)CH_2SC_2H_5$	3-F	$2-CH_3-4-C_2F_5$	Paste
27	$CH(CH_3)CH_2SC_2H_5$	3-F	$2-CH_3-4-OCF_3$	142-147
28	$CH(CH_3)CH_2SOCH_3$	3-I	$2-CH_3-4-C_2F_5$	94
29	$CH(CH_3)CH_2SO_2CH_3$	3-I	$2-CH_3-4-C_2F_5$	100
30	$CH(CH_3)CH_2SOCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	82
31	$CH(CH_3)CH_2SO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	134
32	$CH(CH_3)CH_2SCH_3$	3-I	$2-CH_3-4-SCF_3$	194-195
33	$CH(CH_3)CH_2S-i-C_4H_9$	3-I	$2-CH_3-4-i-C_3F_7$	164-172
34	$CH(CH_3)CH_2S-i-C_4H_9$	3-I	$2-CH_3-4-C_2F_5$	159-160
35	$CH(CH_3)CH_2S-i-C_4H_9$	3-I	$2-CH_3-4-OCF_3$	155-159
36	$CH(CH_2SCH_3)_2$	3-I	$2-CH_3-4-C_2F_5$	145
37	$CH(CH_3)CH_2SCH_3$	$3,4-Cl_2$	$2-CH_3-4-OCF_3$	197-199
38	$CH(CH_3)CH_2SCH_3$	$5,6-Cl_2$	$2-CH_3-4-OCF_3$	213-214
39	$CH(CH_3)CH_2SCH_3$	$3,4-Cl_2$	$2-CH_3-4-C_2F_5$	221-222
40	$CH(CH_3)CH_2SCH_3$	$5,6-Cl_2$	$2-CH_3-4-C_2F_5$	199-200
41	$CH(CH_3)CH_2SCH_3$	$3,4-Cl_2$	$2-CH_3-4-i-C_3F_7$	215-216
42	$CH(CH_3)CH_2SCH_3$	$5,6-Cl_2$	$2-CH_3-4-i-C_3F_7$	220-221
43	$CH(CH_3)CH_2SCH_3$	4-Cl	$2-CH_3-4-C_2F_5$	178-179
44	$CH(CH_3)CH_2SCH_3$	$3,4-F_2$	$2-CH_3-4-OCF_3$	175-176

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
45	$CH(CH_3)CH_2SCH_3$	4,5-F_2	2-CH_3-4-OCF_3	118-120
46	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-OC-$(C_2F_5)=C(CF_3)_2$	196-197
47	$CH(CH_3)CH_2SCH_3$	3-I	2-Cl-4-OCF_2-CHFO-5	198
48	$CH(CH_3)CH_2SCH_3$	3-I	2-Cl-4-OCHF-CF_2O-5	192
49	$CH(CH_3)CH_2SCH_3$	3-I	2-OCH_3-4-C_2F_5	170
50	$CH(CH_3)CH_2SCH_3$	3-I	2-C_2H_5-4-C_2F_5	125
51	$(CH_2)_2SCH_3$	6-I	2-CH_3-4-OCF_3	130-133
52	$(CH_2)_2SCH_3$	3-I	2-CH_3-4-OCF_3	145-150
53	$(CH_2)_2SCH_3$	3-I	2-CH_3-4-C_2F_5	Amorphous
54	$(CH_2)_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	Amorphous
55	$(CH_2)_3SCH_3$	3-I	2-CH_3-4-OCF_3	144-147
56	$(CH_2)_3SCH_3$	3-I	2-CH_3-4-C_2F_5	165-168
57	$(CH_2)_3SCH_3$	3-I	2-CH_3-4-i-C_3F_7	156-159
58	$(CH_2)_2S$-i-C_3H_7	3-I	2-CH_3-4-OCF_3	189-192
59	$(CH_2)_2S$-i-C_3H_7	3-I	2-CH_3-4-C_2F_5	153-155
60	$(CH_2)_2S$-i-C_3H_7	3-I	2-CH_3-4-i-C_3F_7	158-160
61	$CH(CH_3)CH_2S$-2-Pyi	3-I	2-CH_3-4-C_2F_5	Amorphous
62	$CH(CH_3)CH_2S$-2-Pyi	3-I	2-CH_3-4-i-C_3F_7	140-142
63	$CH(CH_3)CH_2S$-n-C_4H_9	3-I	2-CH_3-4-OCF_3	137-139
64	$CH(CH_3)CH_2S$-n-C_4H_9	3-I	2-CH_3-4-C_2F_5	Amorphous
65	$CH(CH_3)CH_2SCH_3$	3-I	2-Cl-4-i-C_3F_7	190

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
66	$CH(CH_3)CH_2SCH_3$	3-I	$2-C_2H_5-4-i-C_3F_7$	205
67	$CH(CH_2SCH_3)_2$	3-I	$2-CH_3-4-i-C_3F_7$	181
68	$CH(CH_2SCH_3)_2$	3-I	$2-CH_3-4-OCF_2CHF_2$	169-176
69	$CH(CH_2SCH_3)_2$	3-I	$2-CH_3-4-OCF_3$	131-139
70	$CH(CH_2SCH_3)_2$	3-I	$2-CH_3-4-OCHF_2$	142
71	$(CH_2)_2SC_2H_5$	3-I	$2-CH_3-4-OCF_3$	157-161
72	$(CH_2)_2SC_2H_5$	3-I	$2-CH_3-4-C_2F_5$	152-155
73	$(CH_2)_2SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	159-162
74	$CH(CH_3)CH_2S$-2-Pyi	3-I	$2-CH_3-4-OCF_3$	203
75	$CH(CH_3)CH_2SO$-2-Pyi	3-I	$2-CH_3-4-C_2F_5$	110-111
76	$CH(CH_3)CH_2SO_2$-2-Pyi	3-I	$2-CH_3-4-i-C_3F_7$	99-100
77	$CH(CH_3)CH_2S-n-C_6H_{13}$	3-I	$2-CH_3-4-OCF_3$	Amorphous
78	$CH(CH_3)CH_2S-n-C_6H_{13}$	3-I	$2-CH_3-4-i-C_3F_7$	152-153
79	$CH(CH_3)CH_2SCH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	201-202
80	$CH(CH_3)CH_2SCH_3$	3-Br	$2-CH_3-4-OCF_3$	195
81	$CH(CH_3)CH_2SCH_3$	3-Br	$2-CH_3-4-C_2F_5$	194-195
82	$CH(CH_3)CH_2S-c-C_6H_{11}$	3-I	$2-CH_3-4-OCF_3$	166-167
83	$CH(CH_3)CH_2S-t-C_4H_9$	3-I	$2-CH_3-4-OCF_3$	188-189
84	$CH(CH_3)CH_2S-t-C_4H_9$	3-I	$2-CH_3-4-C_2F_5$	183-184
85	$CH(CH_3)CH_2S-c-C_6H_{11}$	3-I	$2-CH_3-4-C_2F_5$	102-103
86	$CH(CH_3)CH_2S-c-C_6H_{11}$	3-I	$2-CH_3-4-i-C_3F_7$	95-96
87	$CH(CH_3)CH_2SOCH_3$	3-Br	$2-CH_3-4-OCF_3$	212-213

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
88	$CH(CH_3)CH_2SO_2CH_3$	3-Br	$2-CH_3-4-OCF_3$	93
89	$CH(Ph)CH_2SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	168-170
90	$CH(Ph)CH_2SCH_3$	3-I	$2-CH_3-4-C_2F_5$	157-159
91	$CH(Ph)CH_2SCH_3$	3-I	$2-CH_3-4-OCF_3$	178-180
92	$CH(CH_3)(CH_2)_3SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	160-161
93	$CH(CH_3)(CH_2)_3SCH_3$	3-I	$2-CH_3-4-C_2F_5$	147-149
94	$CH(CH_3)(CH_2)_3SCH_3$	3-I	$2-CH_3-4-OCF_3$	183-185
95	$CH(CH_3)CH_2SOCH_3$	3-Br	$2-CH_3-4-C_2F_5$	90
96	$CH(CH_3)CH_2SO_2CH_3$	3-Br	$2-CH_3-4-C_2F_5$	95
97	$CH(CH_3)CH_2SO_2CH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	153-155
98	$CH(CH_3)CH_2SCH_3$	3-Cl	$2-CH_3-4-OCF_3$	188-189
99	$CH(CH_3)CH_2SCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	202-203
100	$CH(CH_3)CH_2SO_2CH_3$	3-Cl	$2-CH_3-4-OCF_3$	104-105
101	$CH(CH_3)CH_2SO_2CH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	155-156
102	$CH(CH_3)CH_2SO_2CH_3$	3-I	$2-Cl-4-OCHFCF_2O-5$	198
103	$CH(CH_3)CH_2SO_2CH_3$	3-I	$2-Cl-4-OCF_2CHFO-5$	195
104	$CH(CH_3)CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-OCF_3$	181
105	$CH(CH_3)CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-C_2F_5$	190-193
106	$CH(CH_3)CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-i-C_3F_7$	219
107	$CH(CH_3)CH_2SCH_3$	4-I	$2-CH_3-4-OCF_3$	179
108	$CH(CH_3)CH_2SCH_3$	4-I	$2-CH_3-4-C_2F_5$	204
109	$CH(CH_3)CH_2SCH_3$	4-I	$2-CH_3-4-i-C_3F_7$	169-176

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
110	$CH(CH_3)CH_2SCH_3$	5-I	$2-CH_3-4-OCF_3$	127-128
111	$CH(CH_3)CH_2SCH_3$	5-I	$2-CH_3-4-C_2F_5$	143
112	$CH(CH_3)CH_2SCH_3$	5-I	$2-CH_3-4-i-C_3F_7$	189
113	$CH(CH_3)CH_2SCH_3$	3-Cl	$2-CH_3-4-C_2F_5$	189-190
114	$CH(CH_3)CH_2SO_2CH_3$	3-Cl	$2-CH_3-4-C_2F_5$	84-87
115	$CH(CH_3)CH_2SCH_3$	6-Cl	$2-CH_3-4-C_2F_5$	102-103
116	$CH(CH_3)CH_2SO_2CH_3$	6-Cl	$2-CH_3-4-C_2F_5$	233-234
117	$CH(CH_3)CH_2S-t-C_4H_9$	3-I	$2-CH_3-4-i-C_3F_7$	252-256
118	$CH(CH_3)CH_2SO_2$-2-Pyi	3-I	$2-CH_3-4-C_2F_5$	95-100
119	$CH(CH_3)CH_2SO_2$-2-Pyi	3-I	$2-CH_3-4-OCF_3$	92-93
120	$CH(C_2H_5)CH_2SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	190
121	$C(CH_3)_2CH_2SCH_3$	3-I	$2-CH_3-4-C_2F_5$	194-196
122	$C(CH_3)_2CH_2SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	205-206
123	$C(CH_3)_2CH_2SO_2CH_3$	3-I	$2-CH_3-4-C_2F_5$	88-90
124	$C(CH_3)_2CH_2SO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	88-90
125	$C(CH_3)_2CH_2SOCH_3$	3-I	$2-CH_3-4-C_2F_5$	74-76
126	$C(CH_3)_2CH_2SOCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	90-95
127	$CH(C_2H_5)(CH_2)_2SCH_3$	3-I	$2-CH_3-4-C_2F_5$	170
128	$CH(C_2H_5)(CH_2)_2SCH_3$	3-I	$2-CH_3-4-OCF_3$	175
129	$CH(CH_3)CH_2SCH_3$	$3-SCF_3$	$2-CH_3-4-C_2F_5$	201-203
130	$CH(CH_3)CH_2SCH_3$	$3-SCF_3$	$2-CH_3-4-i-C_3F_7$	176-178
131	$CH(CH_3)CH_2SCH_3$	$3-SOCF_3$	$2-CH_3-4-C_2F_5$	183-185

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
132	$CH(CH_3)CH_2SCH_3$	3-$SOCF_3$	2-CH_3-4-i-C_3F_7	154
133	$CH(CH_3)(CH_2)_3SOCH_3$	3-I	2-CH_3-4-C_2F_5	135
134	$CH(CH_3)(CH_2)_3SO_2CH_3$	3-I	2-CH_3-4-C_2F_5	163
135	$CH(CH_3)(CH_2)_3SOCH_3$	3-I	2-CH_3-4-i-C_3F_7	172-175
136	$CH(CH_3)(CH_2)_3SO_2CH_3$	3-I	2-CH_3-4-i-C_3F_7	204
137	$CH(Ph)CH_2SOCH_3$	3-I	2-CH_3-4-i-C_3F_7	142
138	$CH(Ph)CH_2SO_2CH_3$	3-I	2-CH_3-4-i-C_3F_7	203
139	$CH(CH_3)CH_2SO_2$-t-C_4H_9	3-I	2-CH_3-4-OCF_3	90-92
140	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-OCF_3	172-173
141	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-OCF_3	146-147
142	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-OCF_3	86-88
143	$CH(CH_3)CH_2SOCH_3$	3-Cl	2-CH_3-4-OCF_3	199-200
144	$CH(CH_3)CH_2SOCH_3$	3-Cl	2-CH_3-4-C_2F_5	152-155
145	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-s-C_4F_9	120
146	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7-5-F	210
147	$CH(CH_3)CH_2SCH_3$	3-Cl-4-F	2-CH_3-4-OCF_3	188-190
148	$CH(CH_3)CH_2SCH_3$	3-Cl-4-F	2-CH_3-4-C_2F_5	203-204
149	$CH(CH_3)CH_2SCH_3$	3-Cl-4-F	2-CH_3-4-i-C_3F_7	226-227
150	$CH(CH_3)(CH_2)_3SCH_3$	3-Cl	2-CH_3-4-C_2F_5	124
151	$CH(CH_3)(CH_2)_3SCH_3$	6-Cl	2-CH_3-4-C_2F_5	Paste
152	$CH(CH_3)(CH_2)_3SOCH_3$	3-Cl	2-CH_3-4-C_2F_5	150

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
153	$CH(CH_3)(CH_2)_3SO_2CH_3$	3-Cl	$2-CH_3-4-C_2F_5$	117
154	$CH(CH_3)(CH_2)_3SCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	125
155	$CH(CH_3)(CH_2)_3SCH_3$	6-Cl	$2-CH_3-4-i-C_3F_7$	Paste
156	$CH(CH_3)(CH_2)_3SO_2CH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	115
157	$CH(CH_3)CH_2SCH_3$	3-I	$2-CH_3-4-CF_3$	187
158	$CH(CH_3)CH_2SCH_3$	$3-OCH_2-O-4$	$2-CH_3-4-C_2F_5$	110
159	$CH(CH_3)(CH_2)_2SCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	167-169
160	$CH(CH_3)(CH_2)_2SCH_3$	3-Cl	$2-CH_3-4-C_2F_5$	169-171
161	$CH(CH_3)(CH_2)_2SCH_3$	3-Cl	$2-CH_3-4-OCF_3$	183-184
162	$CH(CH_3)(CH_2)_2SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	192-194
163	$CH(CH_3)(CH_2)_2SCH_3$	3-I	$2-CH_3-4-C_2F_5$	200-201
164	$CH(CH_3)(CH_2)_2SCH_3$	3-I	$2-CH_3-4-OCF_3$	193-194
165	$CH(CH_3)CH(CH_3)SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	120
166	$CH(CH_3)CH(CH_3)SO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	130
167	$CH(CH_3)CH(CH_3)SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	105
168	$CH(CH_3)CH(CH_3)SO_2C_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	105
169	$C(CH_3)_2CH_2SCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	199-200
170	$C(CH_3)_2CH_2SCH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	200-201
171	$C(CH_3)_2CH_2SO_2CH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	86
172	$C(CH_3)_2CH_2SOCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	90
173	$CH(CH_3)(CH_2)_4SCH_3$	3-I	$2-CH_3-4-C_2F_5$	156

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
174	$CH(CH_3)(CH_2)_4SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	174
175	$CH(CH_3)(CH_2)_4SC_2H_5$	3-I	$2-CH_3-4-C_2F_5$	147
176	$CH(CH_3)(CH_2)_4SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	168
177	$CH(CH_3)(CH_2)_4SOC_2H_5$	3-I	$2-CH_3-4-C_2F_5$	115
178	$CH(CH_3)(CH_2)_4SOC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	120
179	$CH(CH_3)(CH_2)_4SO_2C_2H_5$	3-I	$2-CH_3-4-C_2F_5$	131
180	$CH(CH_3)(CH_2)_4SO_2C_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	145
181	$C(CH_3)_2CH_2SO_2CH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	90-93
182	$C(CH_3)_2CH_2SOCH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	212-213
183	$C(CH_3)_2CH_2SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	160-162
184	$C(CH_3)_2CH_2SOC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	78-82
185	$C(CH_3)_2CH_2SC_2H_5$	3-Cl	$2-CH_3-4-i-C_3F_7$	132-134
186	$C(CH_3)_2CH_2SO_2C_2H_5$	3-Cl	$2-CH_3-4-i-C_3F_7$	68
187	$C(CH_3)_2CH_2SC_2H_5$	3-Br	$2-CH_3-4-i-C_3F_7$	169-170
188	$CH(CH_3)CH_2S(CH_2)_2SCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	169-171
189	$CH(CH_3)CH_2S(CH_2)_2SCH_3$	3-I	$2-CH_3-4-C_2F_5$	135-137
190	$CH(CH_3)CH_2S(CH_2)_2SCH_3$	3-I	$2-CH_3-4-OCF_3$	159-161
191	$CH(CH_3)CH_2SCH_3$	$3-SO_2-CH_3$	$2-CH_3-4-i-C_3F_7$	205-206
192	$CH(CH_3)CH_2SCH_3$	$6-SO_2-CH_3$	$2-CH_3-4-i-C_3F_7$	210-212

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
193	$CH(CH_3)CH_2SOCH_3$	3,4 $-Cl_2$	$2-CH_3-4-OCF_3$	198-201
194	$CH(CH_3)CH_2SO_2CH_3$	3,4 $-Cl_2$	$2-CH_3-4-OCF_3$	165-167
195	$CH(CH_3)(CH_2)_2SOCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	123-125
196	$CH(CH_3)(CH_2)_2SO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	128-130
197	$CH(CH_3)(CH_2)_4SO_2CH_3$	3-I	$2-CH_3-4-C_2F_5$	145
198	$CH(CH_3)(CH_2)_4SO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	160
199	$CH(CH_3)(CH_2)_3SC_2H_5$	3-I	$2-CH_3-4-C_2F_5$	143
200	$CH(CH_3)(CH_2)_3SO_2C_2H_5$	3-I	$2-CH_3-4-C_2F_5$	117
201	$CH(CH_3)(CH_2)_3SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	150
202	$CH(CH_3)(CH_2)_3SOC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	106
203	$CH(CH_3)(CH_2)_3SO_2C_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	117
204	Q'	3-I	$2-CH_3-4-i-C_3F_7$	202
205	Q^2	3-I	$2-CH_3-4-i-C_3F_7$	249
206	$CH(CH_3)CH_2SCH_2CH=CH_2$	3-I	$2-CH_3-4-i-C_3F_7$	168-175
207	$CH_2CH(CH_3)SC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	150
208	$CH_2CH(CH_3)SO_2C_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	130
209	$CH_2CH(CH_3)SC_2H_5$	6-I	$2-CH_3-4-i-C_3F_7$	155
210	$CH(CH_3)CH_2SCH_3$	$3-OCF_3$	$2-CH_3-4-i-C_3F_7$	184-185
211	$CH(CH_3)(CH_2)_2SOCH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	Amorphous
212	$CH(CH_3)(CH_2)_2SO_2CH_3$	3-Cl	$2-CH_3-4-i-C_3F_7$	108-111

Table 1 (Continued)

No	T'	(X) l	(Y) m	Property mp (°C)
213	$CH(CH_3)(CH_2)_3SC_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	151
214	$CH(CH_3)(CH_2)_3SOC_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	159
215	$CH(CH_3)(CH_2)_3SO_2C_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	150
216	(S)-C* $H(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	212-214
217	(R)-C* $H(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	214-216
218	$C(CH_3)_2CH_2SOC_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	107-110
219	$C(CH_3)_2CH_2S$-n-C_3H_7	3-I	2-CH_3-4-i-C_3F_7	169-170
220	$C(CH_3)_2CH_2SO$-n-C_3H_7	3-I	2-CH_3-4-i-C_3F_7	88-90
221	$C(CH_3)_2CH_2SO_2$-n-C_3H_7	3-I	2-CH_3-4-i-C_3F_7	88-90
222	$CH(CH_3)CH_2SCH_3$	3-Cl-4 -OCH_3	2-CH_3-4-i-C_3F_7	122-125
223	$CH(CH_3)CH_2SCH_3$	3-NO_2	2-CH_3-4 -OCF_2CHFCF_3	218
224	$CH(CH_3)CH_2SCH_3$	3-NO_2	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi	188
225	$C(CH_3)_2CH_2SCH_3$	3-I	2-Cl-4-OCF_3	166
226	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-Cl-4-OCF_3	141
227	$C(CH_3)_2CH_2SCH_3$	3-Br	2-Cl-4-OCF_3	160
228	$C(CH_3)_2CH_2SO_2CH_3$	3-Br	2-Cl-4-OCF_3	133
229	$C(CH_3)_2(CH_2)_3SCH_3$	3-I	2-CH_3-4-i-C_3F_7	164
230	$C(CH_3)_2(CH_2)_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	108

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
231	$C(CH_3)_2(CH_2)_2CH(CH_3)-SCH_3$	3-I	2-CH_3-4-i-C_3F_7	151
232	$C(CH_3)_2CH_2SOCH_3$	3-Br	2-Cl-4-OCF_3	132
233	$CH(CH_3)CH_2SCH_3$	3-I	2-Cl-4-OCF_3	172
234	$CH(CH_3)CH_2SO_2CH_3$	3-I	2-Cl-4-OCF_3	168
235	$C(CH_3)_2CH_2SC_3H_7$-n	3-Br	2-CH_3-4-i-C_3F_7	162-163
236	$C(CH_3)_2CH_2SC_3H_7$-n	3-Cl	2-CH_3-4-i-C_3F_7	149-150
237	$C(CH_3)_2CH_2SO_2C_3H_7$-n	3-Br	2-CH_3-4-i-C_3F_7	176-180
238	$C(CH_3)_2CH_2SO_2C_3H_7$-n	3-Cl	2-CH_3-4-i-C_3F_7	202-203
239	$CH_2CH(CH_3)SCH_3$	3-I	2-CH_3-4-i-C_3F_7	200
240	$CH_2CH(CH_3)SO_2CH_3$	3-I	2-CH_3-4-i-C_3F_7	130
241	$CH(CH_3)CH_2SO_2CH_3$	3-OCF_3	2-CH_3-4-i-C_3F_7	226-228
242	$C(CH_3)_2CH_2SC_2H_5$	3-I	2-Cl-4-OCF_3	163
243	$CH(CH_3)CH_2SOCH_3$	3,4-Cl_2	2-CH_3-4-i-C_3F_7	138-139
244	$CH(CH_3)CH_2SO_2CH_3$	3,4-Cl_2	2-CH_3-4-i-C_3F_7	146-148
245	$CH(CH_3)CH_2SCH_3$	3-CF_3	2-CH_3-4-i-C_3F_7	209
246	$CH(CH_3)CH_2SOCH_3$	3-Cl	2-CH_3-4-i-C_3F_7	110-112
247	$C(CH_3)_2CH_2SC_2H_5$	3-I	2-CH_3-4-C_2F_5	188-189
248	$C(CH_3)_2CH_2SO_2C_2H_5$	3-I	2-CH_3-4-C_2F_5	120-122
249	$C(CH_3)_2CH_2SOC_2H_5$	3-I	2-CH_3-4-C_2F_5	125-126
250	$C(CH_3)_2CH_2SO_2C_2H_5$	3-I	2-CH_3-4-OCF_3	125(Rf=great)
251	$C(CH_3)_2CH_2SO_2C_2H_5$	3-I	2-CH_3-4-OCF_3	146(Rf=small)

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
252	$C(CH_3)_2CH_2SCH_3$	3-OCH_2O-4	2-CH_3-4-OCF_3	220
253	$CH(CH_3)CH_2SOCH_3$	3-OCF_3	2-CH_3-4-i-C_3F_7	220
254	$CH(CH_3)CH_2SOCH_3$	3-CF_3	2-CH_3-4-i-C_3F_7	223
255	$CH(CH_3)CH_2SO_2CH_3$	3-CF_3	2-CH_3-4-i-C_3F_7	199-201
256	$CH(CH_3)(CH_2)_2SC_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	110-113
257	$CH(CH_3)(CH_2)_2SC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	173-174
258	Q^5	3-I	2-CH_3-4-OCF_3	183
259	Q^6	3-I	2-CH_3-4-i-C_3F_7	149
260	$CH(CH_3)CH_2SOC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	96
261	$CH(CH_3)CH_2SO_2C_2H_5$	3-I	2-CH_3-4-i-C_3F_7	98
262	$CH(CH_3)CH_2SC_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	155
263	$CH(CH_3)CH_2SOC_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	96
264	$CH(CH_3)CH_2SO_2C_2H_5$	3-Br	2-CH_3-4-i-C_3F_7	135
265	$CH(CH_3)CH_2SC_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	145
266	$CH(CH_3)CH_2SOC_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	92
267	$CH(CH_3)CH_2SO_2C_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	135
268	$CH(CH_3)CH_2SCH_3$	3-Br	2-CH_3-4-CF_3	170-172
269	$CH(CH_3)(CH_2)_2SOC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	132-134
270	$CH(CH_3)(CH_2)_2SO_2C_2H_5$	3-I	2-CH_3-4-i-C_3F_7	108-110
271	$CH(CH_3)CH_2SC_3H_7$-n	3-Cl	2-CH_3-4-i-C_3F_7	174
272	$C(CH_3)_2(CH_2)_2SC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	171
273	Q^7	3-I	2-CH_3-4-i-C_3F_7	184

Table 1 (Continued)

No	T'	(X) l	(Y) m	Property mp (°C)
274	$CH(CH_3)(CH_2)_2SOC_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	128-130
275	$CH(CH_3)(CH_2)_2SO_2C_2H_5$	3-Cl	2-CH_3-4-i-C_3F_7	105-106
276	$CH(CH_3)CH_2SCH_3$	3-Cl	2-CH_3-4-CF_3	158-160
277	$CH(CH_3)CH_2SO_2CH_3$	3-Br	2-CH_3-4-CF_3	118-120
278	$C(CH_3)_2CH_2SCH_3$	3-OCF_2O-4	2-CH_3-4-i-C_3F_7	182
279	$CH(CH_3)CH_2S$-Pyi	3-I	2-CH_3-4-i-C_3F_7	126
280	$C(CH_3)_2(CH_2)_3SC_2H_5$	3-I	2-CH_3-4-OCF_3	170
281	$C(CH_3)_2(CH_2)_3SCH_3$	3-Br, 6-Br	2-CH_3-4-i-C_3F_7	111 Mixture
282	$C(CH_3)_2(CH_2)_3SC_2H_5$	3-Br, 6-Br	2-CH_3-4-i-C_3F_7	121 Mixture
283	$CH(CH_3)CH_2SO_2CH_3$	3-Cl	2-CH_3-4-CF_3	179-181
284	$CH(CH_3)CH_2SO_2CH_3$	3-I	2-CH_3-4-CF_3	196-198
285	$CH(CH_3)CH_2SCH_2CF_3$	3-I	2-CH_3-4-i-C_3F_7	216
286	$CH(CH_3)CH_2S(CH_2)_2$-$OCOCF_3$	3-I	2-CH_3-4-i-C_3F_7	158-159
287	$CH(CH_3)CH_2S$-C_3H_7-n	3-Br	2-CH_3-4-i-C_3F_7	111
288	$CH(CH_3)CH_2SCH_3$	3-OCF_2O-4	2-CH_3-4-i-C_3F_7	196
289	$CH(CH_3)CH_2SO_2CH_3$	3-OCF_2O-4	2-CH_3-4-i-C_3F_7	223
290	$CH(CH_3)CH_2SCH_3$	3-OCF_2O-4	2-CH_3-4-OCF_3	191
291	$CH(CH_3)CH_2SOCH_3$	3-OCF_2O-4	2-CH_3-4-OCF_3	187
292	$C(CH_3)_2CH_2SCH_3$	3-OCF_2O-4	2-CH_3-4-OCF_3	205

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
293	$C(CH_3)_2CH_2SO_2CH_3$	$3\text{-}OCF_2O\text{-}4$	$2\text{-}CH_3\text{-}4\text{-}OCF_3$	218
294	$CH(CH_3)CH_2SOCH_2CF_3$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	207-209
295	$CH(CH_3)CH_2SO_2CH_2CF_3$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	220-222
296	$CH(CH_3)CH_2S(CH_2)_2OH$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	157-159
297	$CH(CH_3)CH_2S(CH_2)_2\text{-}OC_2H_5$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	165-167
298	CH_2SCH_3	H	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	157-159
299	$CH(CH_3)CH_2S\text{-}2\text{-}(3,5\text{-}(CH_3)_2\text{-}Pym)$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	147-149
300	$CH(CH_3)CH_2SO\text{-}2\text{-}(3,5\text{-}(CH_3)_2\text{-}Pym)$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	126-128
301	$CH(CH_3)CH_2SO_2\text{-}2\text{-}(3,5\text{-}(CH_3)_2\text{-}Pym)$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	134-136
302	$CH(CH_3)CH_2SC(=S)\text{-}N(CH_3)_2$	3-I	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	Paste
303	$CH(CH_3)CH_2SCH_3$	3-I	$2\text{-}CH_3\text{-}3\text{-}C_2F_5$	223-225
304	$CH(CH_3)CH_2SCH_3$	3-I	$2\text{-}CH_3\text{-}5\text{-}C_2F_5$	215-218
305	$CH(CH_3)CH_2SCH_3$	3-Cl	$2\text{-}CH_3\text{-}4\text{-}CF_3$	179-181
306	$CH(CH_3)CH_2SCH_3$	3-Br	$2\text{-}CH_3\text{-}4\text{-}CF_3$	176-177
307	$CH(CH_3)CH_2SCH_3$	3-I	$2\text{-}CH_3\text{-}4\text{-}CF_3$	184-186
308	$CH(CH_3)CH_2SCH_3$	$3\text{-}N{=}C(t\text{-}C_4H_9)O\text{-}4$	$2\text{-}CH_3\text{-}4\text{-}i\text{-}C_3F_7$	113

Table 1 (Continued)

No	T'	(X) l	(Y) m	Property mp (°C)
309	$CH(CH_3)CH_2SC_2H_5$	3-I	$2-CH_3-4-CF_3$	193-194
310	$C(CH_3)_2CH_2SO_2CH_3$	3-Cl	$2-CH_3-4-CF_3$	174-175
311	$C(CH_3)_2CH_2SOCH_3$	3-Br	$2-CH_3-4-CF_3$	85-88
312	$C(CH_3)_2CH_2SO_2CH_3$	3-Br	$2-CH_3-4-CF_3$	151-153
313	$C(CH_3)_2CH_2SOCH_3$	3-I	$2-CH_3-4-CF_3$	102-104
314	$C(CH_3)_2CH_2SO_2CH_3$	3-I	$2-CH_3-4-CF_3$	153-155
315	$CH(CH_3)CH_2S(CH_2)_2-OCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	154-155
316	$CH(CH_3)CH_2S(CH_2)_2-CO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	160-162
317	$CH(CH_3)CH_2SO(CH_2)_2-OC_2H_5$	3-I	$2-CH_3-4-i-C_3F_7$	116-118
318	$CH(CH_3)CH_2SO_2(CH_2)_2-OC_2H_6$	3-I	$2-CH_3-4-i-C_3F_7$	138-140
319	$CH(CH_3)CH_2S$-Bzl	3-I	$2-CH_3-4-i-C_3F_7$	179-181
320	$C(CH_3)_2CH_2SO_2CH_3$	3-Br	$2-CH_3-4-OCF_3$	Crystal
321	$C(CH_3)_2CH_2SCH_3$	3-Br	$2-CH_3-4-OCF_3$	178
322	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-OCF_3$	189
323	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2-Cl-4-CH_3$	204
324	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-Br$	208
325	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-i-C_3F_7$	234
326	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2,4-Cl_2$	178

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
327	$C(CH_3)_2CH_2SOCH_3$	$3-NO_2$	$2-CH_3-4-i-C_3F_7$	143
328	$C(CH_3)_2CH_2SO_2CH_3$	$3-NO_2$	$2-CH_3-4-i-C_3F_7$	197
329	Q[8]	3-I	$2-CH_3-4-i-C_3F_7$	183
330	$CH(CH_3)CH_2SOCH_3$	3-Br	$2-CH_3-4-i-C_3F_7$	118
331	$(CH_2)_2SH$	H	$2-CH_3-4-i-C_3F_7$	170
332	$CH(CH_3)CH_2SCH_3$	4-CH=CH-CH=CH-5	$2-CH_3-4-i-C_3F_7$	158
333	$CH(CH_3)CH_2SCH_3$	3-CH=CH-CH=CH-4	$2-CH_3-4-i-C_3F_7$	194
334	$CH(CH_3)CH_2SOCH_3$	3-CH=CH-CH=CH-4	$2-CH_3-4-i-C_3F_7$	115
335	$CH(CH_3)CH_2SO_2CH_3$	3-CH=CH-CH=CH-4	$2-CH_3-4-i-C_3F_7$	121
336	$CH(CH_3)CH_2SCH_3$	3-CH=CH-CH=CH-4	$2-CH_3-4-OCF_3$	186
337	$CH(CH_3)CH_2SCH_3$	3-Br	$2-Cl-4-OCF_3$	155
338	$CH(CH_3)CH_2SOCH_3$	3-Br	$2-Cl-4-OCF_3$	174
339	$CH(CH_3)CH_2SO_2CH_3$	3-Br	$2-Cl-4-OCF_3$	164
340	$CH(CH_3)CH_2SO(CH_2)_2-OCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	90-93
341	$CH(CH_3)CH_2SO_2(CH_2)_2-OCH_3$	3-I	$2-CH_3-4-i-C_3F_7$	177-178

Table 1 (Continued)

No	T¹	(X)l	(Y)m	Property mp (°C)
342	$CH(CH_3)CH_2SO(CH_2)_2-CO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	144-147
343	$CH(CH_3)CH_2SO_2(CH_2)_2-CO_2CH_3$	3-I	$2-CH_3-4-i-C_3F_7$	201-202
344	$CH(CH_3)CH_2SO$-2-Bzt	3-I	$2-CH_3-4-i-C_3F_7$	133-135
345	$CH(CH_3)CH_2SO_2$-2-Bzt	3-I	$2-CH_3-4-i-C_3F_7$	147-149
346	$CH(CH_3)CH_2SC_2H_5$	$3-OCF_3$	$2-CH_3-4-i-C_3F_7$	189-190
347	$CH(CH_3)CH_2SC_2H_5$	$5-OCF_3$	$2-CH_3-4-i-C_3F_7$	190-192
348	$CH(CH_3)CH_2SCH_3$	$3-CF_3$	$2-CH_3-4-i-C_3F_7$	220-221
349	$CH(CH_3)CH_2SC_2H_5$	$3-CF_3$	$2-CH_3-4-i-C_3F_7$	200-202
350	$(CH_2)_2SC(=S)NHC_2H_5$	H	$2-CH_3-4-i-C_3F_7$	129
351	$CH(CH_3)CH_2SCH_3$	3-OCF2CF2O-4	$2-CH_3-4-i-C_3F_7$	216
352	$CH(CH_3)CH_2S$-2-Thz	3-I	$2-CH_3-4-i-C_3F_7$	180
353	$CH(CH_3)CH_2S$-2-(5-CH_3-1,3,4-Thd)	3-I	$2-CH_3-4-i-C_3F_7$	122-124
354	$CH(CH_3)CH_2S$-2-(5-CH_3-1,3,4-Thd)	6-I	$2-CH_3-4-i-C_3F_7$	148-150
355	$C(CH_3)_2CH_2SCH_3$	$3-OCF_3$	$2-CH_3-4-i-C_3F_7$	208-209
356	$C(CH_3)_2CH_2SCH_3$	$5-OCF_3$	$2-CH_3-4-i-C_3F_7$	225
357	$CH(CH_3)CH_2SO_2C_2H_5$	$3-OCF_3$	$2-CH_3-4-i-C_3F_7$	219-220
358	$C(CH_3)_2CH_2SO_2CH_3$	$3-CF_3$	$2-CH_3-4-i-C_3F_7$	159-161

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
359	$CH(CH_3)CH_2SO_2C_2H_5$	$3-CF_3$	$2-CH_3-4-i-C_3F_7$	218-219
360	$C(CH_3)_2CH_2SO_2CH_3$	$3-OCF_3$	$2-CH_3-4-i-C_3F_7$	168-170
361	$CH(CH_3)CH_2SCH_2CO-N(C_2H_5)_2$	3-I	$2-CH_3-4-i-C_3F_7$	130-131
362	$CH(CH_3)CH_2SOCH_2CO-N(C_2H_5)_2$	3-I	$2-CH_3-4-i-C_3F_7$	95-98
363	$CH(CH_3)CH_2SO_2CH_2CO-N(C_2H_5)_2$	3-I	$2-CH_3-4-i-C_3F_7$	197-199
364	$CH(CH_3)CH_2SO_2$-2-Thz	3-I	$2-CH_3-4-i-C_3F_7$	153-155
365	$C(CH_3)_2CH_2SCH_3$	3-I	$2-CH_2OH-4-i-C_3F_7$	188-191
366	$C(CH_3)_2CH_2SCH_3$	3-I	$2-CH_3-3-F-4-i-C_3F_7$	218-221
367	$C(CH_3)_2CH_2SCH_3$	3-I	$2-CH_3-4-n-C_4F_9$	170-174
368	$CH(CH_3)CH_2SCH_3$	3-I	$2-CH_3-4-Si(CH_3)_3$	203-207
369	$C(CH_3)_2CH_2SCH_3$	3-Cl	$2-Cl-4-OCF_3$	154
370	$C(CH_3)_2CH_2SOCH_3$	3-Cl	$2-Cl-4-OCF_3$	73
371	$C(CH_3)_2CH_2SO_2CH_3$	3-Cl	$2-Cl-4-OCF_3$	149
372	$CH(CH_3)CH_2SCH_3$	$3-Cl-4-CH_3$	$2-CH_3-4-i-C_3F_7$	189
373	$C(CH_3)_2CH_2SCH_3$	$3-NO_2$	$2-CH_3-4-C_2F_5$	218
374	$C(CH_3)_2CH_2SOCH_3$	$3-NO_2$	$2-CH_3-4-C_2F_5$	194

Table 1 (Continued)

No	T'	(X) l	(Y) m	Property mp (°C)
375	$C(CH_3)_2CH_2SO_2CH_3$	3-NO_2	2-CH_3-4-C_2F_5	210
376	$C(CH_3)_2CH_2SCH_3$	3-NO_2	2-Cl-4-OCF_3	181
377	$C(CH_3)_2CH_2SOCH_3$	3-NO_2	2-Cl-4-OCF_3	185
378	$C(CH_3)_2CH_2SO_2CH_3$	3-NO_2	2-Cl-4-OCF_3	186
379	$CH(CH_3)CH_2SO_2CH_3$	3-Cl-4-CH_3	2-CH_3-4-i-C_3F_7	158-159
380	$CH(CH_3)CH_2SCH_3$	3-Cl	2-Cl-4-OCF_3	164
381	$CH(CH_3)CH_2SOCH_3$	3-Cl	2-Cl-4-OCF_3	172
382	$CH(CH_3)CH_2SO_2CH_3$	3-Cl	2-Cl-4-OCF_3	153
383	$CH(CH_3)CH_2SSCH_3$	3-Cl	2-CH_3-4-i-C_3F_7	92
384	$CH(CH_3)CH_2SS$-(2-NO_2-Ph)	3-Cl	2-CH_3-4-i-C_3F_7	91
385	$C(CH_3)_2CH_2SCH_3$	3-F	2-Cl-4-OCF_3	148
386	$C(CH_3)_2CH_2SOCH_3$	3-F	2-Cl-4-OCF_3	102
387	$C(CH_3)_2CH_2SO_2CH_3$	3-F	2-Cl-4-OCF_3	163
388	$CH(CH_3)CH_2SOCH_3$	3-NO_2	2-CH_3-4-i-C_3F_7	218
389	$CH(CH_3)CH_2SOCH_3$	3-NO_2	2-CH_3-4-OCF_3	218
390	$CH(CH_3)CH_2SOCH_3$	3-NO_2	2-CH_3-4-CF_3	243
391	$CH(CH_3)CH_2SOCH_3$	3-NO_2	2-CH_3-4-C_2F_5	210
392	$CH(CH_3)CH_2SH$	3-I	2-CH_3-4-i-C_3F_7	226
393	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOCF_3$	192-193

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
394	$CH(CH_3)CH_2SOCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOCF_3$	206-208
395	$CH(CH_3)CH_2SO_2CH_3$	3-I	2-CH_3-4-OCF_2-$CHFOCF_3$	166-167
396	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	175-176
397	$CH(CH_3)CH_2SCH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	195-197
398	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	180-181
399	$C(CH_3)_2CH_2SC_3H_7$-i	3-I	2-CH_3-4-i-C_3F_7	85-88
400	$C(CH_3)_2CH_2SC_4H_9$-t	3-I	2-CH_3-4-i-C_3F_7	95-98
401	$C(CH_3)_2CH_2SOC_4H_9$-t	3-I	2-CH_3-4-i-C_3F_7	100-104
402	$C(CH_3)_2CH_2SOC_3H_7$-i	3-I	2-CH_3-4-i-C_3F_7	100-104
403	$CH(CH_3)CH_2S$-2-Pyi	3-Br	2-CH_3-4-i-C_3F_7	93
404	$CH(CH_3)CH_2SO$-2-Pyi	3-Br	2-CH_3-4-i-C_3F_7	137
405	$CH(CH_3)CH_2SO_2$-2-Pyi	3-Br	2-CH_3-4-i-C_3F_7	96
406	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	105-108
407	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	135-136

Table 1 (Continued)

No	T^1	(X) l	(Y) m	Property mp (°C)
408	$CH(CH_3)CH_2SOCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	179-181
409	$CH(CH_3)CH_2SO_2CH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	196-198
410	$CH(CH_3)CH_2SOCH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	176-179
411	$CH(CH_3)CH_2SO_2CH_3$	3-I	2-CH_3-4-O-(3-Cl-5-CF_3-2-Pyi)	199-201
412	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-3-F-4-i-C_3F_7	120-125
413	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-3-F-4-i-C_3F_7	206-210
414	$CH(CH_3)CH_2SCH_3$	3-Br	2-C_2H_5-4-i-C_3F_7	175
415	$CH(CH_3)CH_2SCH_3$	3-Br	2-Cl-4-C_2F_5	180
416	$CH(CH_3)CH_2SCH_3$	3-Br	3-i-C_3H_7	135
417	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-OSO_2CF_3	187
418	$C(CH_3)_2CH_2SCH_3$	6-I	2-CH_3-4-OSO_2CF_3	Decomposed
419	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-OSO_2CF_3	Amorphous
420	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	170-172
421	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	68-75
422	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-OCF_2-$CHFOC_3F_7$-n	170-172

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
423	$C(CH_3)_2CH_2SC_3H_7$-i	3-Br	2-CH_3-4-C_2F_5	162-163
424	$C(CH_3)_2CH_2SO_2C_3H_7$-i	3-I	2-CH_3-4-i-C_3F_7	70-75
425	$CH(CH_3)CH_2SC(=S)NH$-CH_3	3-I	2-CH_3-4-i-C_3F_7	142
426	$CH(CH_3)CH_2SC(=S)NH$-C_2H_5	3-I	2-CH_3-4-i-C_3F_7	123
427	$CH(CH_3)CH_2SCONHC_2H_5$	3-I	2-CH_3-4-i-C_3F_7	178
428	$CH(CH_3)CH_2SCOCH_3$	3-I	2-CH_3-4-i-C_3F_7	117
429	$CH(CH_3)CH_2SCH_2C\equiv CH$	3-I	2-CH_3-4-i-C_3F_7	111
430	$CH(CH_3)CH_2SCH_2$-(2,4-Cl_2-Ph)	3-I	2-CH_3-4-i-C_3F_7	140
431	$C(CH_3)_2CH_2S^*OCH_3$ (-)isomer	3-I	2-CH_3-4-i-C_3F_7	Amorphous [α]=-20.4
432	$C(CH_3)_2CH_2S^*OCH_3$ (+)isomer	3-I	2-CH_3-4-i-C_3F_7	Amorphous [α]=20.6
433	$C(CH_3)_2CH_2SCH_3$	3-I	3-CF_2OCF_2O-4	205
434	$C(CH_3)_2CH_2SCH_3$	3-I	2-Cl-3-CF_2OCF_2O-4	173
435	$C(CH_3)_2CH_2SCH_3$	3-I	2-C_2H_5-4-i-C_3F_7	188
436	$C(CH_3)_2CH_2SOCH_3$	3-I	2-C_2H_5-4-i-C_3F_7	125
437	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-C_2H_5-4-i-C_3F_7	166-167
438	$C(CH_3)_2CH_2S$-Ph	3-I	2-CH_3-4-i-C_3F_7	167-168
439	$C(CH_3)_2CH_2SO$-Ph	3-I	2-CH_3-4-i-C_3F_7	107

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
440	$C(CH_3)_2CH_2SO_2$-Ph	3-I	2-CH_3-4-i-C_3F_7	200

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
441	$C(CH_3)_2CH_2S$-2-Pyi	3-I	2-CH_3-4-i-C_3F_7	120-122
442	$C(CH_3)_2CH_2SO$-2-Pyi	3-I	2-CH_3-4-i-C_3F_7	90-95
443	$C(CH_3)_2CH_2SO_2$-2-Pyi	3-I	2-CH_3-4-i-C_3F_7	138
444	$C(CH_3)_2CH_2SO_2$-2-Pyi	6-I	2-CH_3-4-i-C_3F_7	219
445	Q^{10}	3-I	2-CH_3-4-i-C_3F_7	212-213
446	Q^{11}	3-I	2-CH_3-4-i-C_3F_7	193-213
447	Q^{12}	3-I	2-CH_3-4-i-C_3F_7	203-205
448	$C(CH_3)_2CH_2SCH_3$	3-I	2-Cl-4-i-C_3F_7	184
449	$C(CH_3)_2CH_2SOCH_3$	3-I	2-Cl-4-i-C_3F_7	102-105
450	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-Cl-4-i-C_3F_7	200-201
451	$C(CH_3)_2CH_2SCH_2$-(4-Cl-Ph)	3-I	2-CH_3-4-i-C_3F_7	163-164
452	$CH(CH_2OH)(CH_2)_2S$-CH_3	3-I	2-CH_3-4-i-C_3F_7	102
453	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(4-Cl-Ph)	172
454	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-(4-Cl-Ph)	128
455	$C(CH_3)_2CH_2SCH_3$	3-NO_2	2-CH_3-4-S(2-Cl-Ph)	188
456	$C(CH_3)_2CH_2SCH_3$	3-NO_2	2-CH_3-4-S(3-Cl-Ph)	181

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
457	$C(CH_3)_2CH_2SCH_3$	3-NO_2	2-CH_3-4-S(4-Cl-Ph)	201
458	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-S(2-Cl-Ph)	159
459	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-S(3-Cl-Ph)	156
460	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-S(3-Cl-Ph)	156
461	$CH(CH_3)CH_2SCON(CH_3)_2$	3-I	2-CH_3-4-i-C_3F_7	117
462	$CH(CH_3)CH_2SCON(C_2H_5)_2$	3-I	2-CH_3-4-i-C_3F_7	75
463	$CH(CH_3)CH_2SCH_2CO-CH_3$	3-I	2-CH_3-4-i-C_3F_7	86
464	$C(CH_3)_2CH_2SCH_3$	3-I	2-$CH(CH_3)CH_2CH(CH_3)_2$-4-i-C_3F_7	178
465	$C(CH_3)_2CH_2SOCH_3$	3-I	2-$CH(CH_3)CH_2CH(CH_3)_2$-4-i-C_3F_7	100-105
466	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-$CH(CH_3)CH_2CH(CH_3)_2$-4-i-C_3F_7	157-158
467	(S)-$C^*H(CH_3)CH_2S-C_2H_5$	3-I	2-CH_3-4-i-C_3F_7	197
468	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(CO-(4-CH_3-Ph))	138
469	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(CO-(4-Cl-Ph))	171

Table 1 (Continued)

No	T¹	(X)l	(Y)m	Property mp (°C)
470	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(C(=NOCH_3)-(4-Cl-Ph))	Paste
471	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-CH_2(4-Cl-Ph)	162
472	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-CH(OH)(4-Cl-Ph)	Paste
473	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-O(4-Cl-Ph)	179
474	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-O(3-Cl-Ph)	170
475	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-O(3-CN-Ph)	176
476	$CH(CH_3)CH_2SCH_3$	3-O(3-CF_3-Ph)	2-CH_3-4-i-C_3F_7	169-170
477	$CH(CH_3)CH_2SCH_3$	6-O(3-CF_3-Ph)	2-CH_3-4-i-C_3F_7	167-169
478	$C(CH_3)_2CH_2SCH_3$	3-I	4-$SO_2N(C_2H_5)_2$	207-208
479	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH3-4-(CONH(4-Cl-Ph))	236
480	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH3-4-(CON(CH3)-(4-Cl-Ph))	149
481	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH3-4-C(CF3)2OCH3	195-196
482	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH3-4-C(CF3)2OCH3	178-180
483	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH3-4-C(CF3)2OCH3	205-206

Table 1 (Continued)

No	T'	(X)l	(Y)m	Property mp (°C)
484	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-$C(CF_3)_2$-OCH_2-Ph	149-151
485	$C(CH_3)_2CH_2SCH_3$	H	4-CF_3	185-188
486	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-$C(CF_3)_2OH$	143-145
487	$C(CH_3)_2CH_2SCH_3$	3-I	4-$NHSO_2CF_3$	207-209
488	$CH(CH_3)CH_2SOCH_3$	H	4-CF_3	226-227
489	$CH(CH_3)CH_2SO_2CH_3$	H	4-CF_3	192-194
490	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(C(=NOH)-(4-Cl-Ph))	112
491	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-$C(CF_3)_2S$-CH_3	163-164
492	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-$C(CF_3)_2O$-CH_2Ph	150-152
493	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-$C(CF_3)_2O$-CH_2Ph	125-126
494	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(CON-$(C_2H_5)_2$)	187
495	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(CON-$(CH_3)_2$	Amorphous
496	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-$(CF_3)_2O$-C_2H_5	185-186
497	$C(CH_3)_2CH_2SCH_3$	3,4-Cl_2	2-CH_3-4-i-C_3F_7	

Table 1 (Continued)

No	T¹	(X)l	(Y)m	Property mp (°C)
498	$C(CH_3)_2CH_2SOCH_3$	3.4-Cl_2	2-CH_3-4-i-C_3F_7	
499	$C(CH_3)_2CH_2SO_2CH_3$	3.4-Cl_2	2-CH_3-4-i-C_3F_7	
500	$CH(CH_2OCH_3)CH_2S-CH_3$	3-I	2-CH_3-4-i-C_3F_7	
501	$CH(CH_2OCH_3)CH_2-SOCH_3$	3-I	2-CH_3-4-i-C_3F_7	
502	$CH(CH_2OCH_3)CH_2-SO_2CH_3$	3-I	2-CH_3-4-i-C_3F_7	
503	$CH(CF_3)CH_2SCH_3$	3-I	2-CH_3-4-i-C_3F_7	
504	$CH(CH_2SCH_3)CH_2-COOCH_3$	3-I	2-CH_3-4-i-C_3F_7	
505	$CH(CH_2SCH_3)CH_2-CONHCH_3$	3-I	2-CH_3-4-i-C_3F_7	
506	$CH(CH_2SCH_3)CH_2-CON(CH_3)_2$	3-I	2-CH_3-4-i-C_3F_7	
507	$C(CH_3)_2CH_2S-C_3H_5$-c	3-I	2-CH_3-4-i-C_3F_7	
508	$C(CH_3)_2CH_2SO-C_3H_5$-c	3-I	2-CH_3-4-i-C_3F_7	
509	$C(CH_3)_2CH_2SO_2-C_3H_5$-c	3-I	2-CH_3-4-i-C_3F_7	
510	Q'³	3-I	2-CH_3-4-i-C_3F_7	

Table 1 (Continued)

No	T^1	(X)l	(Y)m	Property mp (°C)
511	Q^{16}	3-I	2-CH_3-4-i-C_3F_7	
512	Q^{14}	3-I	2-CH_3-4-i-C_3F_7	
513	Q^{15}	3-I	2-CH_3-4-i-C_3F_7	
514	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-(4-CF_3-Ph)	
515	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-(4-CF_3-Ph)	
516	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-(4-CF_3-Ph)	
517	$C(CH_3)_2CH_2SCH_3$	3-I	2-CH_3-4-OCF_2CF_3	
518	$C(CH_3)_2CH_2SOCH_3$	3-I	2-CH_3-4-OCF_2CF_3	
519	$C(CH_3)_2CH_2SO_2CH_3$	3-I	2-CH_3-4-OCF_2CF_3	
520	$C(CH_3)_2CH_2S(=O)$-OCH_3	3-I	2-CH_3-4-i-C_3F_7	
521	$C(CH_3)_2CH_2SO_3CH_3$	3-I	2-CH_3-4-i-C_3F_7	
522	$C(CH_3)_2CH_2SO_2$-$NHCH_3$	3-I	2-CH_3-4-i-C_3F_7	
523	$C(CH_3)_2CH_2SO_2$-NHC_2H_5	3-I	2-CH_3-4-i-C_3F_7	
524	$C(CH_3)_2CH_2SO_2$-$N(CH_3)_2$	3-I	2-CH_3-4-i-C_3F_7	
523	$C(CH_3)_2CH_2SO_2$-$N(C_2H_5)_2$	3-I	2-CH_3-4-i-C_3F_7	

Table 2

(R^3=H)					
No	T^1	R2	(X)l	(Y)m	Property mp (°C)
2-1	$(CH_2)_2SC_2H_5$	n-C_3H_7	H	2-CH_3-4-i-C_3F_7	Paste
2-2	$(CH_2)_2SCH_3$	n-C_3H_7	H	2-CH_3-4-i-C_3F_7	122
2-3	$(CH_2)_2SCH_3$	n-C_3H_7	3-F	2-CH_3-4-i-C_3F_7	124
2-4	$(CH)_2SO_2CH_3$	n-C_3H_7	3-F	2-CH_3-4-i-C_3F_7	81
2-5	$(CH_2)_2SCH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	132-137
2-6	$(CH_2)_3SCH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	120-122
2-7	$(CH_2)_2SCH_3$	CH_3	3-F	2-CH_3-4-i-C_3F_7	127-132
2-8	CH_2SCH_3	C_2H_5	3-Cl	2-CH_3-4-i-C_3F_7	155-159
2-9	$(CH_2)_2SOCH_3$	CH_3	3-F	2-CH_3-4-i-C_3F_7	Paste
2-10	$(CH_2)_2SO_2CH_3$	CH_3	3-F	2-CH_3-4-i-C_3F_7	160-164
2-11	$(CH_2)_2SOCH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	Paste
2-12	$(CH_2)_2SO_2CH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	Paste
2-13	$(CH_2)_3SOCH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	Paste
2-14	$(CH_2)_3SO_2CH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	173
2-15	$CH(CH_3)CH_2SCH_3$	C_2H_5	3-F	2-CH_3-4-i-C_3F_7	114
2-16	CH_2SCH_3	C_2H_5	3-Cl	2-CH_3-4-OCF_3	
				Refr.Index nD1.5440 (21.0°C)	
2-17	CH_2SCH_3	C_2H_5	3-Cl	2-CH_3-4-OC_2F_5	
				Refr.Index nD1.5365 (21.0°C)	

General formula (1)

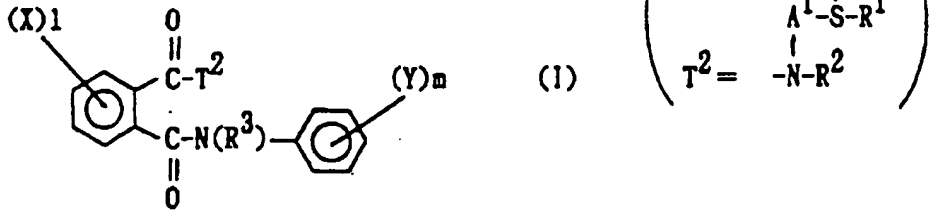
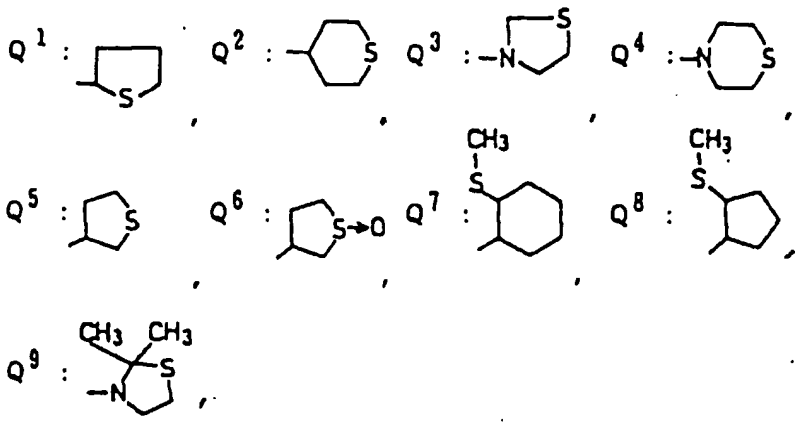
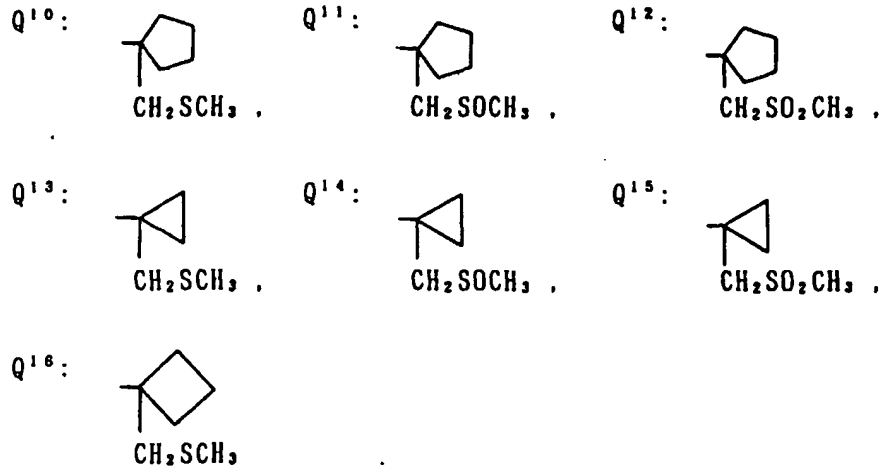


Table 3

(R^2=R^3=H)				
No	T^2	(X)l	(Y)m	Property mp (°C)
3-1	Q^3	3-I	2-CH_3-4-C_2F_5	163
3-2	Q^3	3-I	2-CH_3-4-i-C_3F_7	144
3-3	Q^4	3-I	2-CH_3-4-OCF_3	173-175
3-4	Q^4	3-I	2-CH_3-4-C_2F_5	158-160
3-5	Q^4	3-I	2-CH_3-4-i-C_3F_7	186-188
3-6	Q^9	3-I	2-CH_3-4-i-C_3F_7	195-197

[0046] In Tables 1 to 3, "Ph" means phenyl group; "Pyi" means pyridyl group; "Pym" means pyrimidyl group; "Thz" means thiazolyl group; "Thd" means thiadiazolyl group; "Bzt" means benzothiazolyl group; "c-" means an alicyclic hydrocarbon group; and Q^1, Q^2, Q^3, Q^4, Q^5, Q^6, Q^7, Q^8, Q^9, Q^{10}, Q^{11}, Q^{12}, Q^{13}, Q^{14}, Q^{15} and Q^{16} represent the following compounds:





[0047] In Tables 1, 2 and 3, some compounds show a property of paste. The ^{1}H-NMR data of such compounds are shown in Table 4.

Table 4

No	^{1}H-NMR[$CDCl_3$/TMS, δ value (ppm)]
2	0.8-1.4(m.9H), 2.4(s.3H), 2.5-2.8(m.3H), 4.3(m.1H), 6.2(d.1H), 7.2-7.5(m.3H), 7.8(d.1H), 8.0(d.1H), 8.4(d.1H), 8.5(s.1H).

[0048] The agrohorticultural insecticides containing the phthalamide derivative of the general formula (I) or salt thereof of the present invention as an active ingredient are suitable for controlling various insect pests such as agricultural insect pests, forest insect pests, horticultural insect pests, stored grain insect pests, sanitary insect pests, nematodes, etc., which are injurious to paddy rice, fruit trees, vegetables, other crops, flowers and ornamental plants, etc. They have a marked insecticidal effect, for example, on LEPIDOPTERA including summer fruit tortrix (Adoxophyes orana fasciata), smaller tea tortrix (Adoxophyes sp.), Manchurian fruit moth (Grapholita inopinata), oriental fruit moth (Grapholita molesta), soybean pod border (Leguminivora glycinivorella), mulberry leafroller (Olethreutes mori), tea leafroller (Caloptilia thevivora), Caloptilia sp. (Calopilia zachrysa), apple leafminer (Phyllonorycter ringoniella), pear barkminer (Spulerrina astaurota), common white (Piers rapae crucivora), tabacco budworm (Heliothis sp.) codling moth (Laspey resia pomonella), diamondback moth (Plutella xylostella), apple fruit moth (Argyresthia conjugella), peach fruit moth (Carposina niponensis), rice stem borer (Chilo suppressalis), rice leafroller (Cnaphalocrocis medinalis), tabacco moth (Ephestia elutella), mulberry pyralid (Glyphodes pyloalis), yellow rice borer (Scirpophaga incertulas), rice skipper (Parnara guttata), rice armyworm (Pseudaletia separata), pink borer (Sesamia inferens), common cutworm (Spodoptera litura), beet armyworm (Spodoptera exigua), etc.; HEMIPTERA including aster leafhopper (Macrosteles fascifrons), green rice leafhopper (Nephotettix cincticeps), brown rice planthopper (Nilaparvata lugens), whitebacked rice planthopper (Sogatella furcifera), citrus psylla (Diaphorina citri), grape whitefly (Aleurolobus taonabae), sweetpotato whitefly (Bemisia tabaci), greenhouse whitefly (Trialeurodes vaporariorum), turnip aphid (Lipaphis erysimi), green peach aphid (Myzus persicae), Indian wax scale (Ceroplastes ceriferus), cottony citrus scale (Pulvinaria aurantii), camphor scale (Pseudaonidia duplex), san Jose scale (Comstockaspis perniciosa), arrowhead scale (Unaspis yanonensis), etc.; TYLENCHIDA including root-lesion namatode (Pratylenchus sp.), soybean beetle (Anomala rufocuprea), Japanese beetle (Popillia japonica), tabacco beetle (Lasioderma serricorne), powderpost beetle (Lyctus brunneus), twenty-eight-spotted ladybird (Epilachna vigintiotopunctata), azuki bean weevile (Callosobruchus chinensis), vegetable weevile (Listroderes costirostris), maize weevile (Sitophilus zeamais), boll weevile (Authonomus gradis gradis), rice water weevil (Lissorhoptrus oryzophilus), cucurbit leaf beetle (Aulacophora femoralis), rice leaf beetle (Oulema oryzae), striped flea beetle (Phyllotreta striolata), pine shoot beetle (Tomicus piniperda), Colorado potato beetle (Leptinotarsa decemlineata), Mexican bean beetle (Epilachna varivestis), corn rootworm (Diabrotica sp.), etc.; DIPTERA including melon fly (Dacus(Zeugodacus) cucurbitae), oriental fruit fly (Dacus(Bactrocera) dorsalis), rice leafminer (Agnomyza

oryzae), onion maggot (Delia antigua), seedcorn maggot (Delia platura), soybean pod gall midge (Asphondylia sp.), muscid fly (Musca domestica), house mosquito (Culex pipiens pipiens), etc.; and TYLENCHIDA including coffer root-lesion nematode (Pratylenchus coffeae), potato cyst nematode (Globodera rostochiensis), root-knot nematode (Meloidogyne sp.), citrus nematode (Tylenchulus semipenetrans), Aphelenchus sp. (Aphelenchus avenae), chrysanthemum foliar (Aphelenchoides ritzemabosi), etc.

[0049] The agricultural and horticultural insecticide containing the phthalamide derivative of the general formula (I) or salt thereof of the present invention as an active ingredient has a marked insecticidal effect on the above-exemplified insect pests, sanitary insect pests, and/or nematodes, which are injurious to paddy field crops, upland crops, fruit trees, vegetables, other crops, flowers and ornament plants, and the like. Therefore, the desired effect of the agricultural and horticultural insecticide of the present invention can be obtained by applying the insecticide to paddy field; upland field; crops such as fruits, vegetables, ornament plants and the like; seeds, flowers, stalks, leaves, etc. of plants itself; environments of plant growth such as paddy field water, soil, etc. at a season at which the insect pests, sanitary pests or nematodes are expected to appear, before their appearance or at the time when their appearance is confirmed.

[0050] In general, the agricultural and horticultural insecticide of the present invention is used after being prepared into conveniently usable forms according to an ordinary manner for preparation of agrochemicals.

[0051] That is, the phthalamide derivative of the general formula (I) or salt thereof and, optionally, an adjuvant are blended with a suitable inert carrier in a proper proportion and prepared into a suitable preparation form such as a suspension, emulsifiable concentrate, soluble concentrate, wettable powder, granules, dust or tablets through dissolution, dispersion, suspension, mixing, impregnation, adsorption or sticking.

[0052] The inert carrier used in this invention may be either solid or liquid. As the solid carrier, there can be exemplified soybean flour, cereal flour, wood flour, bark flour, saw dust, powdered tobacco stalks, powdered walnut shells, bran, powdered cellulose, extraction residues of vegetables, powdered synthetic polymers or resins, clays (e.g. kaolin, bentonite, and acid clay), talcs (e.g. talc and pyrophyllite), silica powders or flakes (e.g. diatomaceous earth, silica sand, mica and white carbon, i.e. synthetic, high-dispersion silicic acid, also called finely divided hydrated silica or hydrated silicic acid, some of commercially available products contain calcium silicate as the major component), activated carbon, powdered sulfur, powdered pumice, calcined diatomaceous earth, ground brick, fly ash, sand, calcium carbonate powder, calcium phosphate powder and other inorganic or mineral powders, chemical fertilizers (e.g. ammonium sulfate, ammonium phosphate, ammonium nitrate, urea and ammonium chloride), and compost. These carriers may be used alone or as a mixture thereof.

[0053] The liquid carrier is that which itself has solubility or which is without such solubility but is capable of dispersing an active ingredient with the aid of an adjuvant. The following are typical examples of the liquid carrier and can be used alone or as a mixture thereof. Water; alcohols such as methanol, ethanol, isopropanol, butanol and ethylene glycol; ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone and cyclohexanone; ethers such as ethyl ether, dioxane, Cellosolve, dipropyl ether and tetrahydrofuran; aliphatic hydrocarbons such as kerosene and mineral oils; aromatic hydrocarbons such as benzene, toluene, xylene, solvent naphtha and alkylnaphthalenes; halogenated hydrocarbons such as dichloroethane, chloroform, carbon tetrachloride and chlorobenzene; esters such as ethyl acetate, diisopropyl phthalate, dibutyl phthalate and dioctyl phthalate; amides such as dimethylformamide, diethylformamide and dimethylacetamide; nitriles such as acetonitrile; and dimethyl sulfoxide.

[0054] The following are typical examples of the adjuvant, which are used depending upon purposes and used alone or in combination in some cases, or need not to be used at all.

[0055] To emulsify, disperse, dissolve and/or wet an active ingredient, a surfactant is used. As the surfactant, there can be exemplified polyoxyethylene alkyl ethers, polyoxyethylene alkylaryl ethers, polyoxyethylene higher fatty acid esters, polyoxyethylene resinates, polyoxyethylene sorbitan mono-laurate, polyoxyethylene sorbitan monooleate, alkylarylsulfonates, naphthalenesulfonic acid condensation products, ligninsulfonates and higher alcohol sulfate esters.

[0056] Further, to stabilize the dispersion of an active ingredient, tackify it and/or bind it, there may be used adjuvants such as casein, gelatin, starch, methyl cellulose, carboxymethyl cellulose, gum arabic, polyvinyl alcohols, turpentine, bran oil, bentonite and ligninsulfonates.

[0057] To improve the flowabililty of a solid product, there may be used adjuvants such as waxes, stearates and alkyl phosphates.

[0058] Adjuvants such as naphthalenesulfonic acid condensation products and polycondensates of phosphates may be used as a peptizer for dispersible products.

[0059] Adjuvants such as silicon oils may also be used as a defoaming agent.

[0060] The content of the active ingredient may be varied as required and may be chosen in a range of 0.01 to 80% by weight as an active ingredient. In dusts or granules, the suitable content thereof is from 0.01 to 50% by weight. In emulsifiable concentrates or flowable wettable powders, it is also from 0.01 to 50% by weight.

[0061] The agricultural and horticultural insecticide of the present invention is used to control a variety of insect pests in the following manner. That is, it is applied to a crop on which the insect pests are expected to appear or a site where the appearance of the insect pests is undesirable, as it is or after being properly diluted with or suspended inwa-

ter or the like, in an amount effective for control of the insect pests.

[0062] The applying dosage of the agricultural and horticultural insecticide of the present invention is varied depending upon various factors such as a purpose, insect pests to be controlled, a growth state of a plant, tendency of insect pests appearance, weather, environmental conditions, a preparation form, an application method, an application site and an application time. It may be properly chosen in a range of 0.1 g to 10 kg (in terms of the active ingredient) per 10 ares depending upon purposes.

[0063] The agricultural and horticultural insecticide of the present invention may be used in admixture with other agricultural and horticultural disease or pest controllers, acaricides, nematicides, bioagrochemicals, etc.; and herbicides, plant growth regulators, manures, etc. depending upon scenes using the present agricultural and horticultural insecticides, in order to expand both spectrum of controllable diseases and insect pest species and the period of time when effective applications are possible or to reduce the dosage.

[0064] The agrohorticultural insecticide of the present invention may be applied to the plant seeds or the cultivation mediums for seeding such as soil to be seeded, the mat for raising seedlings, water, etc. by the method of application to rice nursery box, seed powdering, etc. or by the method of seed disinfection. For controlling the pest insects generated on fruit trees, cereals, upland field for vegetables, etc., it is also possible to make a plant absorb the agrohorticultural agent of the present invention by a seed treatment such as powder coating, dipping, etc., irrigation into seedling-raising carrier such as seedling-raising vessel, planting hole, etc. or by treatment of the culture solution for water culture.

EXAMPLES

[0065] Next, typical examples of the present invention are presented below. The present invention is by no means limited by these examples.

Example 1

(1-1) Production of N-[4-(1,1,2,3,3,3-hexafluoropropoxy)-1-methylphenyl]-3-nitrophthalimide

[0066] In 30 ml of acetic acid were dissolved 1.93 g of 3-nitrophthalic anhydride and 2.73 g of 4-(1,1,2,3,3,3-hexafluoropropoxy)-1-methylaniline. A reaction was carried out for 3 hours with heating under reflux. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane, whereby 4.4 g of the objective compound was obtained.

Property: m.p. 121°C; Yield: 98%

(1-2) Production of N^1-[4-(1,1,2,3,3,3-hexafluoropropoxy)-1-methylphenyl]-N^2-(1-methyl-2-methylthioethyl)-3-nitrophthalamide (Compound No. 223)

[0067] In 10 ml of dioxane was dissolved 0.54 g of N-[4-(1,1,2,3,3,3-hexafluoropropoxy)-1-methylphenyl]-3-nitrophthalimide. Then, 0.25 g of 1-methyl-2-methylthioethylamine and 0.01 g of acetic acid were added to the solution obtained above, and a reaction was carried out for 3 hours with heating under reflux. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was purified by column chromatography using 1/1 mixture of hexane and ethyl acetate as an eluent. Thus, 0.45 g of the objective compound having an Rf value of 0.4 to 0.5 was obtained.

Property: m.p. 218°C; Yield: 68%

Example 2

(2-1) Production of 3-fluoro-N-(4-heptafluoroisopropyl-2-methylphenyl)phthalimide

[0068] In 10 ml of acetic acid were dissolved 1.33 g of 3-fluorophthalic anhydride and 4-heptafluoroisopropyl-2-methylaniline. A reaction was carried out for 3 hours with heating under reflux. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane to obtain 3.1 g of the objective compound.

Property: m.p. 155-157°C; Yield: 97%

(2-2) Production of N-(heptafluoroisopropyl-2-methylphenyl)phthalimide

[0069] In 20 ml of dimethylformamide was dissolved 2.54 g of 3-fluoro-N-(4-heptafluoroisopropyl-2-methylphenyl)-phthalimide. After adding 2.8 g of a 15% aqueous solution of methylmercaptan to the solution obtained above, a reaction was carried out at room temperature for 3 hours with stirring. After completion of the reaction, the reaction solution was poured into water, and the objective product was extracted with ethyl acetate. The extract solution was dried on anhydrous magnesium, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane. Thus, 2.2 g of the objective compound was obtained.

Property: m.p. 163-165°C; Yield: 81%

(2-3) Production of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-methylsulfonylphthalimide

[0070] In 20 ml of dichloromethane was dissolved 0.63 g of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-methylthiophthalimide. While cooling the solution with ice, 0.58 g of m-chloroperbenzoic acid was added and reacted at room temperature. After completion of the reaction, the reaction solution was poured into water, and the objective product was extracted with chloroform. The organic layer was washed with an aqueous solution of sodium thiosulfate and an aqueous solution of potassium carbonate and dried on anhydrous magnesium, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane. Thus, 0.63 g of the objective compound was obtained.

Property: m.p. 185-187°C; Yield: 93%

(2-4) Production of N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-2-methylthioethyl)-3-methylsulfonylphthalamide (Compound No. 191) and N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-2-methylthioethyl)-6-methylsulfonylphthalamide (Compound No. 192)

[0071] In 10 ml of dioxane was dissolved 0.63 g of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-methylsulfonylphthalimide. After adding 0.25 g of 1-methyl-2-methylthioethylamine and 0.01 g of acetic acid to the solution obtained above, a reaction was carried out for 3 hours with heating under reflux. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was purified by silica gel column chromatography using 1/1 mixture of hexane and ethyl acetate as an eluent. Thus, 0.42 g of the first objective compound having an Rf value of 0.5 to 0.7 (Compound No. 191) and 0.18 g of the second objective compound having an Rf value of 0.2 to 0.3 (Compound No. 192) were obtained.

Compound No. 191: Property: m.p. 205-206°C;
Yield: 55%
Compound No. 192: Property: m.p. 210-212°C;
Yield: 24%

Example 3

(3-1) Production of 3-iodo-N-(1-methyl-3-methylthiopropyl)-phthalamic acid

[0072] To a suspension of 2.74 g of 3-iodophthalic anhydride in 8 ml of acetonitrile cooled with ice was slowly added dropwise a solution of 1.19 g of 1-methyl-3-methylthiopropylamine in 3 ml of acetonitrile. After completion of the dropping, a reaction was carried out at room temperature for 3 hours with stirring. After completion of the reaction, the deposited crystal was collected by filtration and washed with a small quantity of acetonitrile. Thus, 3.5 g of the objective compound was obtained.

Property: m.p. 148-150°C; Yield: 89%

(3-2) Production of 6-iodo-N-(1-methyl-3-methylthiopropyl)-phthalisoimide

[0073] To a suspension of 0.79 g of 3-iodo-N-(1-methyl-3-methylthiopropyl)phthalamic acid in 10 ml of toluene was added 0.63 g of trifluoroacetic anhydride. A reaction was carried out at room temperature for 30 minutes with stirring. After completion of the reaction, the solvent was distilled off under reduced pressure to obtain 0.75 g of a crude objective product, which was used in the subsequent reaction without purification.

(3-3) Production of 6-iodo-N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-3-methylthiopropyl)phthalamide (Compound No. 162)

[0074] In 10 ml of acetonitrile was dissolved 0.75 g of 6-iodo-N-(1-methyl-3-methylthiopropyl)phthalisoimide. After adding 0.55 g of 4-heptafluoroisopropyl-2-methylaniline and 0.01 g of trifluoroacetic acid to the solution obtained above, a reaction was carried out for 3 hours with stirring. After completion of the reaction, the deposited crystal was collected by filtration and washed with a small quantity of cold acetonitrile. Thus, 1.17 g of the objective compound was obtained.

Property: m.p. 192-194°C; Yield: 90%

(3-4) Production of 3-iodo-N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-3-methylsulfenylpropyl)-phthalamide (Compound No. 195)

[0075] In 10 ml of dichloromethane was dissolved 0.65 g of 6-iodo-N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-3-methylthiopropyl)phthalamide. After adding 0.18 g of m-chloroperbenzoic acid to the solution obtained above, a reaction was carried out at room temperature for 3 hours. After completion of the reaction, the reaction solution was poured into water, and the objective product was extracted with chloroform. The organic layer was washed with an aqueous solution of sodium thiosulfate and an aqueous solution of potassium carbonate and dried on anhydrous magnesium sulfate, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane. Thus, 0.61 g of the objective compound was obtained.

Property: m.p. 123-125°C; Yield: 92%

(3-5) Production of 3-iodo-N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-3-methylsulfonylpropyl)-phthalamide (Compound No. 196)

[0076] 3-Iodo-N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-(1-methyl-3-methylsulfenylpropyl)phthalamide (0.4 g) was treated in the same manner as in Example (3-4). Thus, 0.39 g of the objective compound was obtained.

Property: m.p. 128-130°C; Yield: 95%

Example 4

(4-1) Production of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxybenzamide

[0077] In 50 ml of tetrahydrofuran was dissolved 2.24 g of 3-trifluoromethoxybenzoyl chloride, to which were slowly added dropwise 2.75 g of 4-heptafluoroisopropyl-2-methylaniline and 1.2 g of triethylamine. After completion of the dropping, a reaction was carried out at room temperature for 1 hour. After completion of the reaction, the reaction solution was poured into water, the objective product was extracted with ethyl acetate and dried on anhydrous magnesium sulfate, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane. Thus, 4.6 g of the objective compound was obtained.

Property: Oily product; Yield: 99%

(4-2) Production of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxyphthalamic acid

[0078] In 20 ml of tetrahydrofuran was dissolved 2.2 g of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxybenzamide. At -70°C, 10 ml of s-butyllithium (0.96 M/L) was slowly added to the above solution and reacted at that temperature for 30 minutes. Then, the cooling bath was removed, and an excessive amount of carbon dioxide was introduced into the reaction solution and reacted at room temperature for 30 minutes. After completion of the reaction, the reaction solution was poured into water and acidified with dilute hydrochloric acid, the objective product was extracted with ethyl acetate and dried on anhydrous magnesium sulfate, the solvent was distilled off under reduced pressure, and the residue was washed with a mixture of ether and hexane. Thus, 2.1 g of the objective compound was obtained.

Property: m.p. 168-172°C; Yield: 87%

(4-3) Production of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxyphthalisoimide

[0079] To a suspension of 0.46 g of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxyphthalamic acid in 10 ml of toluene was added 0.51 g of trifluoroacetic anhydride, and a reaction was carried out at room temperature for 30 minutes. After completion of the reaction, the solvent was distilled off under reduced pressure to obtain 0.49 g of a crude objective product. The product thus obtained was used in the subsequent reaction without purification.

(4-4) Production of N^1-(4-heptafluoroisopropyl-2-methylphenyl)-N^2-3-(1-methyl-2-methylthioethyl)-3-trifluoromethoxyphthalamide (Compound No. 210)

[0080] In 10 ml of acetonitrile was dissolved 0.44 g of N-(4-heptafluoroisopropyl-2-methylphenyl)-3-trifluoromethoxyphthalisoimide. Then, 0.10 g of 1-methyl-2-methylthioethylaniline and 0.01 g of trifluoroacetic acid were added to the solution obtained above, and reacted for 3 hours. After completion of the reaction, the reaction solution was cooled to 0°C, the deposited crystal was collected by filtration, and washed with hexane. Thus, 0.46 g of the objective compound was obtained.

Property: m.p. 184-185°C; Yield: 77%

[0081] Next, typical formulation examples of the present invention and test examples are presented below. The present invention is by no means limited by these examples.

[0082] In the formulation examples, the term "parts" means "parts by weight".

Formulation Example 1

[0083]

Each compound listed in Table 1, 2 or 3	50 parts
Xylene	40 parts
Mixture of polyoxyethylene nonylphenyl ether and calcium alkylbenzenesulfonate	10 parts

[0084] An emulsifiable concentrate was prepared by mixing uniformly the above ingredients to effect dissolution.

Formulation Example 2

[0085]

Each compound listed in Table 1, 2 or 3	3 parts
Clay powder	82 parts
Diatomaceous earth powder	15 parts

[0086] A dust was prepared by mixing uniformly and grinding the above ingredients.

Formulation Example 3

[0087]

Each compound listed Table 1, 2 or 3	5 parts

(continued)

Mixed powder of bentonite and clay	90 parts
Calcium lignin sulfonate	5 parts

[0088] Granules were prepared by mixing the above ingredients uniformly, and kneading the resulting mixture together with a suitable amount of water, followed by granulation and drying.

Formulation Example 4

[0089]

Each compound listed in Table 1, 2 or 3	20 parts
Mixture of kaolin and synthetic high-dispersion silicic acid	75 parts
Mixture of polyoxyethylene nonylphenyl ether and calcium alkylbenzenesulfonate	5 parts

[0090] A wettable powder was prepared by mixing uniformly and grinding the above ingredients.

Test Example 1: Insecticidal effect on diamond back moth (Plutella xylostella)

[0091] Adult diamondback moths were released and allowed to oviposit on a Chinese cabbage seedling. Two days after the release, the seedling having the eggs deposited thereon was immersed for about 30 seconds in a liquid chemical prepared by diluting a preparation containing each compound listed in Table 1, 2 or 3 as an active ingredient to adjust the concentration to 50 ppm. After air-dryness, it was allowed to stand in a room thermostatted at 25°C. Six days after the immersion, the hatched insects were counted. The mortality was calculated according to the following equation and the insecticidal effect was judged according to the criterion shown below. The test was carried out with triplicate groups of 10 insects.

$$\text{Corrected mortality(\%)} = \frac{[\text{Number of hatched insects in untreated group}]-[\text{Number of hatched insects in treated group}]}{[\text{Number of hatched insects in untreated group}]} \times 100$$

Criterion:

[0092]

Effect	Mortality(%)
A	100
B	99 - 90
C	89 - 80
D	79 - 50

[0093] The results obtained are shown in Table 5.

Test Example 2: Insecticidal effect on common cutworm (Spodoptera Litura)

[0094] A piece of cabbage leaf (cultivar; Shikidori) was immersed for about 30 seconds in a liquid chemical prepared by diluting a preparation containing each compound listed in Table 1, 2 or 3 as an active ingredient to adjust the

concentration to 50 ppm. After air-dryness, it was placed in a plastic Petri dish with a diameter of 9 cm and inoculated with second-instar larvae of common cutworm, after which the dish was closed and then allowed to stand in a room thermostatted at 25°C. Eight days after the inoculation, the dead and alive were counted. The mortality was calculated according to the following equation and the insecticidal effect was judged according to the criterion shown in Test Example 1. The test was carried out with triplicate groups of 10 insects.

$$\text{Corrected mortality(\%)} = \frac{[\text{Number of alive larvae in untreated group}]-[\text{Number of alive larvae in treated group}]}{[\text{Number of alive larvae in untreated group}]} \times 100$$

[0095] The results are shown in Table 5.

Test Example 3: Insecticidal effect on smaller tea tortrix (Adoxophyes sp.)

[0096] A leaf of tea tree was immersed for 30 seconds in a liquid chemical containing each compound listed in Table 1, 2 or 3 as an active ingredient to adjust the concentration to 50 ppm. After air-dryness, the leaf was transferred to a plastic dish with a diameter of 9 cm and inoculated with larval smaller tea tortrix. Then, the leaf was allowed to stand in a room thermostatted at 25°C at a humidity of 70%. Eight days after the inoculation, the dead and alive were counted, and the insecticidal effect was judged according to the same criterion as mentioned in Test Example 1. The test was carried out with triplicate groups of 10 insects.

[0097] The results are shown in Table 5.

Table 5

No	Test Example 1	Test Example 2	Test Example 3
1	A	A	A
2	A	A	A
3	A	A	A
4	A		
5	A	A	
6	A	A	A
7	A	A	A
8	A		C
9	A		
10	A	A	A
11	A	A	A
12	A		
13	A		
14	A		
15	A		
16	A		A
17	A	A	A
18	A	A	A
19	A	A	A
20	A	A	A
21	A	A	A
22	A	A	A
23	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
24	A		A
25	A	A	A
26	A	A	A
27	A		
28	A	A	A
29	A	A	A
30	A	A	A
31	A	A	A
32	A	A	A
33	A	A	A
34	A	A	A
35	A	A	A
36	A		
37	A	A	A
38	A		A
39	A	A	A
41	A	A	A
42	A		
43	A		A
44	A		A
46	A		A
47	A		
48	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
49	A	A	A
50	A	A	A
51	A		
52	A		
53	A		A
54	A	C	A
55	A		
56	A	A	A
57	A		A
58	A		
59	A		A
60	A		A
61	A	A	A
62	A	A	A
63	A		A
64	A		A
65	A	A	A
66	A	A	A
67	A	A	A
71	A		
72	A		A
73	A	C	A
74	A	D	

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
7 5	A	A	A
7 6	A	A	A
7 7	A		
7 8	A		
7 9	A	A	A
8 0	A	A	A
8 1	A	A	A
8 2	A		A
8 3	A	A	A
8 4	A	A	A
8 5	A		A
8 6	A	A	A
8 7	A	C	
8 8	A	C	
8 9	A		A
9 0	A		A
9 2	A	A	A
9 3	A	A	A
9 4	A	A	A
9 5	A	A	A
9 6	A	A	A
9 7	A	A	A
9 8	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
99	A	A	A
100	A	C	A
101	A	A	A
102	A	A	
103	A		
104	A		
105	A		A
106	A	A	A
107	A		
108	A	A	
109	A	A	A
110	A		
111	A		B
112	A	A	A
113	A	A	A
114	A	A	A
115	A	A	
116	A		
117	A		A
118	A	A	A
119	A	A	A
120	A		
121	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
122	A	A	A
123	A	A	A
124	A	A	A
125	A	A	A
126	A	A	A
127	A	A	A
129	A		
130	A	A	A
132	A		
133	A	A	
134	A	A	A
135	A	A	A
136	A	A	A
137	A		A
139	A	A	
140	A	A	A
141	A	A	
142	A	A	A
143	A	D	
144	A	A	
145	A	A	A
146	A	A	A
147	A		

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
148	A	C	
149	A	A	
150	A	A	A
151	A		
152	A		
153	A	A	A
154	A	A	A
155	A		A
156	A	A	A
157	A	A	A
158	A		
159	A	A	A
160	A	A	A
161	A	A	A
162	A	A	A
163	A	A	A
164	A		A
165	A	A	A
166	A	A	A
167	A	A	A
168	A	A	A
169	A	A	A
170	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
171	A		A
172	A		
173	A	A	A
174	A	C	A
175	A	D	A
176	A	A	A
177	A		
178	A	D	A
179	A		A
180	A		A
181	A	A	A
182	A	A	A
183	A	A	A
184	A	A	A
185	A	A	A
186	A	A	A
187	A	A	A
188	A	A	A
189	A	A	A
190	A		A
191	A	A	A
192	A		
193	A	D	

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
194	A		
195	A	A	A
196	A	A	A
197	A	C	A
198	A	A	A
199	A	A	A
200	A	A	A
201	A	A	A
202	A		A
203	A	A	A
204	A	A	A
205	A	A	A
206	A	A	A
207	A	A	A
208	A	A	A
209	A		
210	A	A	A
211	A	A	A
212	A	A	A
213	A	A	A
214	A		
215	A		A
216	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
217	A	A	A
218	A	A	A
219	A	A	A
220	A	A	A
221	A	A	A
222	A		
223	A		
224	A		A
225	A	A	A
226	A	A	A
227	A	A	
228	A	A	
229	A	A	A
230	A	A	A
231	A	A	A
232	A	A	
233	A	A	
234	A	A	A
235	A	A	A
236	A	A	A
237	A	A	A
238	A	A	A
239	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
240	A	A	A
241	A	A	A
242	A	A	A
243	A	A	A
244	A	A	A
245	A	A	A
246	A	A	A
247	A	A	A
248	A	A	A
249	A	A	A
250	A	A	
251	A		A
252	A		A
253	A	A	A
254	A	A	A
255	A	A	A
256	A	A	A
257	A	A	A
258	A		
259	A	A	A
260	A	A	A
261	A	A	A
262	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
263	A	A	A
264	A	A	A
265	A	A	A
266	A	A	A
267	A	A	A
268	A	A	A
269	A	A	A
270	A	A	A
271	A	C	A
272	A	A	A
273	A		C
274	A	C	A
275	A		
276	A	A	A
277	A		
278	A	A	A
279	A		C
280	A	C	A
281	A	A	A
282	A	A	A
283	A	A	A
284	A	A	A
285	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
286	A	C	A
287	A	A	A
288	A	A	A
289	A		
290	A	D	
292	A		
293	A		A
294	A	A	A
295	A	A	A
296	A	A	A
297	A	A	A
298	A		A
299	A	D	A
300	A		
301	A		A
302	A		A
303	A	A	A
305	A	A	A
306	A	A	A
307	A	A	
309	A	A	A
310	A	A	A
311	A	A	

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
312	A	A	A
313	A	A	A
314	A	A	A
315	A	A	A
316	A	A	A
317	A	A	A
318	A	A	A
319	A		A
320	A	C	D
321	A	A	A
322	A		
324	A		
325	A	A	A
326	A		A
327	A		A
328	A	A	A
329	A		A
330	A	A	A
332	A		A
333	A	A	A
334	A		A
335	A		D
336	A	C	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
337	A	A	
338	A	A	
339	A	A	A
340	A	A	
341	A	A	A
342	A		
343	A		
344	A		A
345	A		
346	A	A	A
347	A		
348	A	A	A
349	A	A	A
351	A	A	A
352	A		A
353	A		A
355	A	A	A
356	A		
357	A	A	A
358	A	A	A
359	A	A	A
360	A	A	A
361	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
362	A	A	A
363	A	A	A
364	A	A	A
365	A	A	A
366	A	A	A
367	A	A	A
368	A		A
369	A	A	A
370	A	A	
371	A	A	A
372	A	A	A
373	A	A	A
374	A	A	A
375	A	A	
376	A	C	A
377	A		
378	A		
379	A		
380	A	A	A
381	A	A	
382	A	A	A
383	A	A	A
384	A	D	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
385	A	C	
386	A		
387	A		
388	A	A	A
389	A		
390	A		
391	A		
392	A	D	A
393	A	A	A
394	A	A	A
395	A	A	A
396	A	A	A
397	A	A	A
398	A	A	A
399	A	A	A
400	A	A	A
401	A	A	A
402	A	A	A
403	A	A	A
404	A	A	A
405	A	A	A
406	A	A	A
407	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
408	A	A	A
409	A	A	A
410	A	A	
411	A	A	A
412	A	A	A
413	A	A	A
414	A	A	A
415	A	A	A
417	A	A	A
419	A	A	A
420	A	A	A
421	A	A	A
422	A	A	A
423	A	A	A
424	A	A	B
425	A	A	
426	A	D	C
427	A	A	C
428	A	D	A
429	A	A	A
430	A	A	A
431	A	A	A
432	A	A	A

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
433	A	A	A
434	A	A	A
435	A	A	A
436	A	A	A
437	A	A	A
438	A	A	A
439	A	A	A
440	A	A	A
441	A	A	A
442	A	A	A
443	A	A	A
444	A	D	A
445	A		A
446	A		
447	A		
448	A	A	A
449	A	A	A
450	A	A	A
451	A		A
452	A		
453	A	A	A
454	A	A	A
459	A		

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
460	A	A	D
461	A		D
462	A	D	A
463	A	A	A
465	A		
467	A	A	A
469	A		
470	A	C	A
471	A		A
472	A		A
473	A		B
474	A		D
475	A		A
478	A		
480	A		A
481	A	A	A
482	A	A	A
483	A	A	A
484	A	A	A
486	A	A	A
490	A	C	A
491	–	–	–
492	–	–	–

Table 5 (Continued)

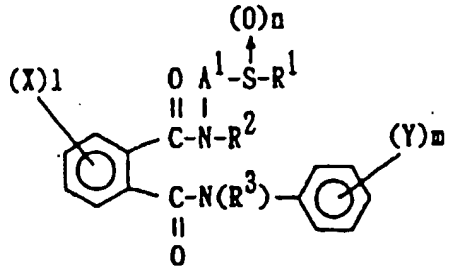
No	Test Example 1	Test Example 2	Test Example 3
493	—	—	—
494	—	—	—
495	—	—	—
496	—	—	—

Table 5 (Continued)

No	Test Example 1	Test Example 2	Test Example 3
2 – 3	A		A
2 – 5	A	C	
2 – 6	A	D	
2 – 7	A		
2 – 8	A	A	
2 – 9	A		
2 – 10	A	D	A
2 – 11	A		
2 – 12	A		A
2 – 13	A		A
2 – 14	A	C	A
2 – 15	A	A	A
2 – 16	A		
2 – 17	A	A	
3 – 1	A	A	
3 – 2	A		

Claims

1. A phthalamide derivative represented by the following general formula (I) or salt thereof:



(I)

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, hydroxy C_1-C_6 alkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkynylene group, or substituted C_3-C_8 alkynylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group,

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group, C_3-C_8 alkynylene group and substituted C_3-C_8 alkynylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group and substituted C_3-C_8 alkenylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring or C_3-C_6 cycloalkene ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom,

cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^2-R^4$ [wherein A^2 represents -C(=O)-, -C(=S)- , $-C(=NR^5)-$ (in which R^5 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkoxy group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, phenyl group or substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group),

C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents -C(=O)-, -C(=S)-or $-C(=NR^5)-$ wherein R^5 is as defined above, R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-Z^1-R^6$ wherein Z^1 represents -O-, -S- or $-N(R^7)-$ (wherein R^7 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group or C_1-C_6 alkoxycarbonyl group), and R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(2) in cases where A^2 represents C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^4 represents hydrogen atom, halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6

cycloalkyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-Z^2-R^8$ wherein Z^2 represents -O-, -S-, -SO-, $-SO_2-$, $-N(R^9)-$ (wherein R^9 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), -C(=O)- or $-C(=NOR^{10})-$ (wherein R^{10} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group) and R^8 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group], or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

R^2 and R^3 which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group or $-A^2-R^4$ wherein A^2 and R^4 are as defined above; or

alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

X which may be same or different, represents halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group,

nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^3-R^{11} [wherein A^3 represents -O-, -S-, -SO-, -SO_2-, -C(=O)-, -C(=NOR^{12})- (in which R^{12} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^3 represents -O-, -S-, -SO- or -SO_2-, R^{11} represents halo C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^4-R^{13} (wherein A^4 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{13} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^5-R^{14} (wherein A^5 represents -O-, -S-, -SO-, -SO_2- or -C(=O)-, and R^{14} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group)), and

(2) in cases where A^3 represents -C(=O)- or -C(=NOR^{12})- wherein R^{12} is as defined above, R^{11} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono C_1-

C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylamino group, substituted phenylamino group having on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(3) in cases where A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^{11} represents hydrogen atom, hydroxy group, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^6-R^{15} (wherein A^6 represents -O-, -S-, -SO- or -SO_2-, and R^{15} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^7-R^{16} (wherein A^7 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{16} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkyl-

sulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group))]; and l represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

Y may be same or different and represents halogen atom, cyano group, nitro group, halo C_3-C_6 cycloalkyl group, tri C_1-C_6 alkylsilyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^3-R^{11}$ wherein A^3 and R^{11} are as defined above; and m represents an integer of 0 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, and substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

n represents an integer of 0 to 2;

provided that when X, R^2 and R^3 simultaneously represent hydrogen atom, m represents an integer of 2, Y of the 2-position represents fluorine atom and Y of the 3-position represents chlorine atom, then A^1 is not propylene group, R^1 is not methyl group and n is not an integer of 0.

2. A phthalamide derivative or salt thereof according to Claim 1,

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or

different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, and C_1-C_6 alkylthio C_1-C_6 alkyl group, C_3-C_8 alkynylene group, or substituted C_3-C_8 alkynylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group and C_1-C_6 alkylthio C_1-C_6 alkyl group,

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group, C_3-C_8 alkynylene group and substituted C_3-C_8 alkynylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group and substituted C_3-C_8 alkenylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring or C_3-C_6 cycloalkene ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^2-R^4$ [wherein A^2 represents -C(=O)-, -C(=S)- , -C(=NR^5)- (in which R^5 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkoxy group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, phenyl group or substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group),
C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents -C(=O)-, -C(=S)-or -C(=NR^5)- wherein R^5 is as defined above, R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo

C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or -Z^1-R^6 wherein Z^1 represents -O-, -S- or -N(R^7)- (wherein R^7 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group or C_1-C_6 alkoxycarbonyl group), and R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, and

(2) in cases where A^2 represents C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^4 represents hydrogen atom, halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, or -Z^2-R^8 wherein Z^2 represents -O-, -S-, -SO-, -SO_2-, -N(R^9)-(wherein R^9 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), -C(=O)- or -C(=NOR^{10})- (wherein R^{10} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group) and R^8 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-

C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group], or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;
R^2 and R^3 which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group or $-A^2-R^4$ wherein A^2 and R^4 are as defined above; or
alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;
X which may be same or different, represents halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_2-C_6 alkynyl group, halo C_2-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, or C_1-C_6 alkoxycarbonyl group and 1 represents an integer of 0 to 4; and
alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and
Y may be same or different and represents halogen atom, cyano group, nitro group, halo C_3-C_6 cycloalkyl group, tri C_1-C_6 alkylsilyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^3-R^{11}$ [wherein A^3 represents -O-, -S-, -SO-, $-SO_2-$, -C(=O)-, $-C(=NOR^{12})-$ (in which R^{12} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^3 represents -O-, -S-, -SO- or $-SO_2-$, R^{11} represents phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^4-R^{13}$ (wherein A^4 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{13} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, or -A-R^{14} (wherein A^5 represents -O-, -S-, -SO-, $-SO_2-$ or -C(=O)-, and R^{14} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-

C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group)), and

(2) in cases where A^3 represents -C(=O)- or -C(=NOR^{12})- wherein R^{12} is as defined above, R^{11} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylamino group, substituted phenylamino group having on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, and

(3) in cases where A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^{11} represents hydrogen atom, hydroxy group, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or -A^6-R^{15} (wherein A^6 represents -O-, -S-, -SO- or -SO_2-, and R^{15} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or -A^7-R^{16} (wherein A^7 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{16} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy

group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group))] and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and
n represents an integer of 0 to 2.

3. A phthalamide derivative or salt thereof according to Claim 2,

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group and C_1-C_6 alkylthio C_1-C_6 alkyl group and

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group and substituted C_1-C_8 alkylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group and substituted C_1-C_8 alkylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring;
R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, mono C_1-C_6 alkylamino C_1-C_6 alkyl group, di C_1-C_6 alkylamino C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkylthiocarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, mono C_1-C_6 alkylamino thiocarbonyl group, di C_1-C_6 alkylamino thiocarbonyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl C_1-C_6 alkyl group, C_1-C_6 alkoxyimino C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl C_1-C_6 alkyl group, mono C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group, di C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_6 alkyl group, substituted phenyl C_1-C_6 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom,

cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

R^2 and R^3 which may be same or different, represent hydrogen atom, C_1-C_6 alkyl group; or

alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

X which may be same or different, represents halogen atom, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_2-C_6 alkynyl group, halo C_2-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group and 1 represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

Y may be same or different and represents halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, hydroxy halo C_1-C_6 alkyl group, C_1-C_6 alkoxy halo C_1-C_6 alkyl group, C_1-C_6 alkylthio halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio halo C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, halo C_3-C_6 alkenyloxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkoxy halo C_1-C_6 alkylthio group, halo C_1-C_6 alkenylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group, and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group, and halo C_1-C_6 alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, pyridyloxy group, substituted pyridyloxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, pyridylthio group, substituted pyridylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

n represents an integer of 0 to 2.

4. A phthalamide derivative or salt thereof according to Claim 3, wherein A^1 represents C_1-C_8 alkylene group;

R^1 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylthio group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, mono C_1-C_6 alkylaminothiocarbonyl group, di C_1-C_6 alkylaminothiocarbonyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl C_1-C_6 alkyl group, C_1-C_6 alkoxyimino C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl C_1-C_6 alkyl group, mono C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group or di C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different;

R^2 and R^3 which may be same or different, represent hydrogen atom or C_1-C_6 alkyl group;

X which may be same or different, represents halogen atom, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group; and l represents an integer of 0 to 4; and

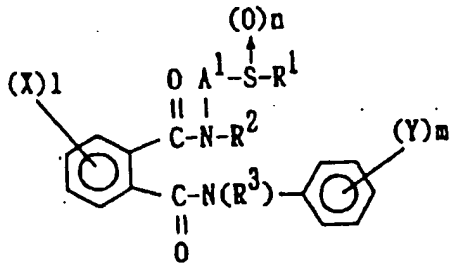
alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group;

Y may be same or different and represents halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, or substituted pyridyloxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and

n represents an integer of 0 to 2.

5. An agrohorticultural insecticide characterized by containing, as an active ingredient thereof, a phthalamide derivative represented by the following general formula (I) or salt thereof:



(I)

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkyl-

sulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, hydroxy C_1-C_6 alkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, C_3-C_8 alkynylene group, or substituted C_3-C_8 alkynylene group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group,

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group, C_3-C_8 alkynylene group and substituted C_3-C_8 alkynylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group and substituted C_3-C_8 alkenylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring or C_3-C_6 cycloalkene ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^2-R^4$ [wherein A^2 represents -C(=O)-, -C(=S)- , -C(=NR^5)- (in which R^5 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkoxy group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, phenyl group or substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6

alkoxycarbonyl group),

C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents -C(=O)-, -C(=S)-or -C(=NR^5)- wherein R^5 is as defined above, R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -Z^1-R^6 wherein Z^1 represents -O-, -S- or -N(R^7)- (wherein R^7 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group or C_1-C_6 alkoxycarbonyl group), and R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(2) in cases where A^2 represents C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^4 represents hydrogen atom, halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -Z^2-R^8 wherein Z^2 represents -O-, -S-, -SO-, -SO_2-, -N(R^9)- (wherein R^9 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy

group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), -C(=O)- or -C(=NOR^{10})- (wherein R^{10} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group) and R^8 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group], or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

R^2 and R^3 which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group or -A^2-R^4 wherein A^2 and R^4 are as defined above; or

alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

X which may be same or different, represents halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^3-R^{11} [wherein A^3 represents -O-, -S-, -SO-, -SO$_2$-, -C(=O)-, -C(=NOR^{12})- (in which R^{12} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6

alkoxycarbonyl group), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^3 represents -O-, -S-, -SO- or -SO_2-, R^{11} represents halo C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^4-R^{13} (wherein A^4 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{13} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^5-R^{14} (wherein A^5 represents -O-, -S-, -SO-, -SO_2- or -C(=O)-, and R^{14} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group)), and

(2) in cases where A^3 represents -C(=O)- or -C(=NOR^{12})- wherein R^{12} is as defined above, R^{11} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylamino group, substituted phenylamino group having on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6

alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, and

(3) in cases where A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^{11} represents hydrogen atom, hydroxy group, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^6-R^{15} (wherein A^6 represents -O-, -S-, -SO- or -SO_2-, and R^{15} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or -A^7-R^{16} (wherein A^7 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{16} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group))]; and l represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of

halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

Y may be same or different and represents halogen atom, cyano group, nitro group, halo C_3-C_6 cycloalkyl group, tri C_1-C_6 alkylsilyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^3-R^{11}$ wherein A^3 and R^{11} are as defined above; and m represents an integer of 0 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, and substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group; and

n represents an integer of 0 to 2.

6. An agrohorticultural insecticide according to Claim 5,

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, phenyl group and substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, and C_1-C_6 alkylthio C_1-C_6 alkyl group, C_3-C_8 alkynylene group, or substituted C_3-C_8 alkynylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group and C_1-C_6 alkylthio C_1-C_6 alkyl group,

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group, substituted C_3-C_8 alkenylene group, C_3-C_8 alkynylene group and substituted C_3-C_8 alkynylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group, C_3-C_8 alkenylene group and

substituted C_3-C_8 alkenylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring or C_3-C_6 cycloalkene ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, or $-A^2-R^4$ [wherein A^2 represents -C(=O)-, -C(=S)- , $-C(=NR^5)-$ (in which R^5 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkoxy group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, phenyl group or substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group),

C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents -C(=O)-, -C(=S)-or $-C(=NR^5)-$ wherein R^5 is as defined above, R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-Z^1-R^6$ wherein Z^1 represents -O-, -S- or $-N(R^7)-$ (wherein R^7 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group or C_1-C_6 alkoxycarbonyl group), and R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, and

(2) in cases where A^2 represents C_1-C_8 alkylene group, halo C_1-C_8 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^4 repre-

sents hydrogen atom, halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, or $-Z^2-R^8$ wherein Z^2 represents -O-, -S-, -SO-, $-SO_2-$, $-N(R^9)-$(wherein R^9 represents hydrogen atom, C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), -C(=O)- or $-C(=NOR^{10})-$ (wherein R^{10} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group) and R^8 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group], or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

R^2 and R^3 which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group or $-A^2-R^4$ wherein A^2 and R^4 are as defined above; or

alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

X which may be same or different, represents halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_2-C_6 alkynyl group, halo C_2-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, or C_1-C_6 alkoxycarbonyl group and l represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6

alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

Y may be same or different and represents halogen atom, cyano group, nitro group, halo C_3-C_6 cycloalkyl group, tri C_1-C_6 alkylsilyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^3-R^{11}$ [wherein A^3 represents -O-, -S-, -SO-, $-SO_2-$, -C(=O)-, $-C(=NOR^{12})-$ (in which R^{12} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^3 represents -O-, -S-, -SO- or $-SO_2-$, R^{11} represents phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^4-R^{13}$ (wherein A^4 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{13} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, and halo C_1-C_6 alkylsulfonyl group, or $-A^5-R^{14}$ (wherein A^5 represents -O-, -S-, -SO-, $-SO_2-$ or -C(=O)-, and R^{14} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group)), and

(2) in cases where A^3 represents -C(=O)- or $-C(=NOR^{12})-$ wherein R^{12} is as defined above, R^{11} represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylamino group, substituted phenylamino group having on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio

group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, and

(3) in cases where A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^{11} represents hydrogen atom, hydroxy group, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^6$-R^{15} (wherein A^6 represents -O-, -S-, -SO- or $-SO_2$-, and R^{15} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^7$-R^{16} (wherein A^7 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, and R^{16} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group))] and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and
n represents an integer of 0 to 2.

7. An agrohorticultural insecticide according to Claim 6,

wherein A^1 represents C_1-C_8 alkylene group, substituted C_1-C_8 alkylene group having at least one, same or different substituents selected from the group consisting of halogen atom, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group and C_1-C_6 alkylthio C_1-C_6 alkyl group and

further, an arbitrary saturated carbon atom in said C_1-C_8 alkylene group and substituted C_1-C_8 alkylene group may be substituted with a C_2-C_5 alkylene group to form a C_3-C_6 cycloalkane ring, and arbitrary two carbon atoms in said C_1-C_8 alkylene group and substituted C_1-C_8 alkylene group may be taken conjointly with an alkylene group or an alkenylene group to form a C_3-C_6 cycloalkane ring;

R^1 represents hydrogen atom, mercapto group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, mono C_1-C_6 alkylamino C_1-C_6 alkyl group, di C_1-C_6 alkylamino C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkylthiocarbonyl group, C_1-C_6 alkoxycarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, mono C_1-C_6 alkylamino thiocarbonyl group, di C_1-C_6 alkylamino thiocarbonyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl C_1-C_6 alkyl group, C_1-C_6 alkoxyimino C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl C_1-C_6 alkyl group, mono C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group, di C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, phenyl C_1-C_6 alkyl group, substituted phenyl C_1-C_6 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, and C_1-C_6 alkoxycarbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, heterocyclic group, or substituted heterocyclic group having at least one, same or different substituents selected from the group consisting of halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different and C_1-C_6 alkoxycarbonyl group, or

alternatively, R^1 may be combined with A^1 to form a 5- to 8-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

R^2 and R^3 which may be same or different, represent hydrogen atom, C_1-C_6 alkyl group; or

alternatively, R^2 may be combined with A^1 or R^1 to form a 5- to 7-membered ring which may be intercepted by 1 or 2, same or different oxygen atoms, sulfur atoms or nitrogen atoms;

X which may be same or different, represents halogen atom, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_2-C_6 alkynyl group, halo C_2-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group and 1 represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

Y may be same or different and represents halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, hydroxy halo C_1-C_6 alkyl group, C_1-C_6 alkoxy halo C_1-C_6 alkyl group, C_1-C_6 alkylthio halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio halo C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, halo C_3-C_6 alkenyloxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkoxy halo C_1-C_6 alkylthio group, halo C_1-C_6 alkenylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono C_1-C_6 alkylamino group, di C_1-C_6 alkylamino group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkoxycarbonyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group, and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group, and halo C_1-C_6 alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, pyridyloxy group, substituted pyridyloxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, pyridylthio group, substituted pyridylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

n represents an integer of 0 to 2.

8. An agrohorticultural insecticide according to Claim 7, wherein A^1 represents C_1-C_8 alkylene group;

R^1 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, C_1-C_6 alkylthio group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, C_1-C_6 alkylcarbonyl group, mono C_1-C_6 alkylaminocarbonyl group, di C_1-C_6 alkylaminocarbonyl group in which C_1-C_6 alkyl groups may be same or different, mono C_1-C_6 alkylaminothiocarbonyl group, di C_1-C_6 alkylaminothiocarbonyl group in which C_1-C_6 alkyl groups may be same or different, C_1-C_6 alkylcarbonyl C_1-C_6 alkyl group, C_1-C_6 alkoxyimino C_1-C_6 alkyl group, C_1-C_6 alkoxycarbonyl C_1-C_6 alkyl group, mono C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group or di C_1-C_6 alkylaminocarbonyl C_1-C_6 alkyl group in which C_1-C_6 alkyl groups may be same or different;

R^2 and R^3 which may be same or different, represent hydrogen atom or C_1-C_6 alkyl group;

X which may be same or different, represents halogen atom, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group; and 1 represents an integer of 0 to 4; and

alternatively, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group;

Y may be same or different and represents halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, or substituted pyridyloxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 1 to 5; and

Y may be taken conjointly with an adjacent carbon atom on the phenyl ring to form a fused ring, and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group; and
n represents an integer of 0 to 2.

9. A method for using an agrohorticultural insecticide, characterized by treating an objective crop or applying to soil in an effective quantity of the agrohorticultural insecticide according to any one of Claims 5 to 8 for the purpose of protecting a useful crop.

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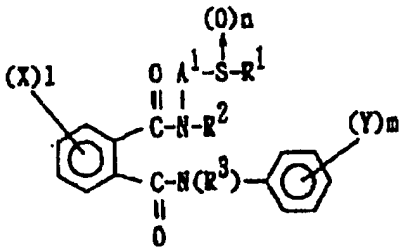
(54) Phthalamide derivatives, or salt thereof agrohorticultural insecticide, and method for using the same

(57) The present invention provides a phthalamide derivative of the formula (I):



(I)

[wherein A^1 is (substituted) C_1-C_8 alkylene, (substituted) C_3-C_8 alkenylene, (substituted) C_3-C_8 alkynylene, etc., R^1 is H, (halo) C_3-C_6 cycloalkyl, (substituted) phenyl, (substituted) heterocycle, -A^2-R^4, etc., R^2 and R^3 are H, C_3-C_6 cycloalkyl, -A^2-R^4, etc., A^2 is -C(=O)-, -C(=S)- or -C(=NR^5)-, R^4 is H, alkyl, (substituted) phenyl, (substituted) heterocycle, etc., X and Y are halogen, cyano, nitro, (halo) C_1-C_6 alkyl, (halo) C_1-C_6 alkoxy, etc., 1 is 0-4, m is 0-5, n is 0-2]; and an agrohorticultural insecticide containing said compound as active ingredient and exhibiting an excellent insecticidal effect.

EP 1 006 107 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 12 3195

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

C07C
C07D
A01N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 December 2002	English, R

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 12 3195

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82